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BULLETIN

DE LA

SOCIÉTÉ ROYALE ENTOMOLOGIQUE

D'ÉGYPTE

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DU

SEIZIÈME VOLUME

1932

(Nouvelle Série)

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DECRET NOMMANT LE PRESIDENT
DE LA SOCIETE ROYALE ENTOMOLOGIQUE D'EGYPTE (1)

Nous, Roi d'Egypte,

Vu Notre Décret en date du 29 Ramadan 1341 (15 mai 1923) approuvant les Statuts de la Société Royale Entomologique d'Egypte ;

Sur la proposition du Président de Notre Conseil des Ministres et l'avis conforme du dit Conseil ;

DECRETONS :

Art. 1er. — Dr. Mohamed Shahine Pacha, Notre Médecin Privé, est nommé Président de la Société Royale Entomologique d'Egypte.

Art. 2. — Le Président de Notre Conseil des Ministres est chargé de l'exécution du présent décret.

Fait au Palais d'Abdine, le 13 Chawal 1341.
(29 Mai 1923).

FOUAD.

Par le Roi :
Le Président du Conseil des Ministres,
YEHIA IBRAHIM.

---

(1) Le présent Décret est extrait du « Journal Officiel » du Gouvernement Egyptien, numéro 57, du Lundi 4 Juin 1923.

DECRET APPROUVANT LES STATUTS DE LA SOCIETE ROYALE ENTOMOLOGIQUE D'EGYPTE (1).

Nous, Roi d'Egypte,

Considérant le but élevé pour lequel a été fondée la Société Royale Entomologique d'Egypte.

Considérant l'opportunité d'encourager et de seconder les travaux de la dite Société ;

Sur la proposition du Président de Notre Conseil des Ministres et l'avis conforme du dit Conseil ;

DECRETONS :

Art. 1er. — La Société Royale Entomologique d'Egypte est placée sous le Haut Patronage du Gouvernement Egyptien.

Les statuts annexés au présent décret sont approuvés (2).

Art. 2. — Le Président du Conseil des Ministres est chargé de l'exécution de Notre présent décret.

Fait au Palais d'Abdine, le 29 Ramadan 1341.
(15 Mai 1923).

FOUAD.

Par le Roi :
Le Président du Conseil des Ministres,
YEHIA IBRAHIM.

(Traduction).

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(1) Ce Décret a été publié dans le *Journal Officiel* du Gouvernement Egyptien, numéro 77, en date du Jeudi 2 Août 1923.

(2) Le texte complet des statuts est aussi publié dans le Bulletin de cette Société, année 1922.

Membres du Conseil de la Société Royale Entomologique d'Egypte en 1932 :

S.E. le Docteur Mohamed Shahine Pacha. *Président.*

M. le Dr. Avocat Giovanni Ferrante, *Vice-Président.*

M. le Docteur Walter Innes Bey, *Vice-Président.*

M. Anastase Alfieri, *Secrétaire-Général.*

M. Richard Wilkinson, *Trésorier.*

S.E. Mohamed Efflatoun Pacha.

M. le Prof. Dr. H. Priesner.

M. A. Honoré.

M. le Docteur Kamel Mansour.

M. Hassan C. Efflatoun Bey.

M. Edgard Chakour.

M. Abdel Megid El Mistikawy.

Comité Scientifique :

M. le Doct. Prof. H. Priesner, M. Hassan C. Efflatoun Bey, M. Abdel Megid El Mistikawy, M. le Doct. Kamel Mansour.

Censeurs :

M. le Dr. A. Azadian et M. E. Kaourk.

MEMBRES BIENFAITEURS :

1924 M. Moustapha Bey El Salankili, de Damanhour (Béhéra).

1925 S.E. El Sayed Fathalla Pacha Mahmoud, de Rahmania (Béhera).

» M. Riad Bey Abdel Kawi El Gebali, de Chebin El Kom (Menoufia).

» S.E. Georges Pacha Wissa, d'Assiout (Haute-Egypte).

» M. Yehia Bey Kawalli, de Minieh (Haute-Egypte).

» M. Yacoub Bibawi Attia Bey, de Minieh (Haute-Egypte).

» S.E. Hassan Charawi Pacha, de Minieh (Haute-Egypte).

» S.E. Habib Chenouda Pacha, d'Assiout (Haute-Egypte).

» M. Mohamed Bey Tewfick Mohanna, de Tewfikieh (Béhéra).

» M. Hassan Ahmed Bey Moussa, de Minieh (Haute-Egypte).

» M. Labib Barsoum Hanna, de Minieh (Haute-Egypte).

» M. Hassan Mohamed Bey El Tahtawi, de Guirgheh (Haute-Egypte).

» M. Kassem Osman El Labban Bey, de Guirgheh (Haute-Egypte).

» M. Dordeir El Sayed Ahmed El Ansari Bey, de Guirgheh (Haute-Egypte).

» M. Barsoum Said Abdel Messih Bey, de Minieh (Haute-Egypte).

» M. Dordeir Taha Abou Gounema Bey, de Minieh (Haute-Egypte).

1926 M. Mohamed Bey Rifaat El Roznamgy.

1927 M. le Dr. Walter Innes Bey, du Caire.

» M. le Dr. Avocat Giovanni Ferrante, du Caire.

1928 M. Hassan C. Efflatoun Bey, du Caire.

» M. Hugo Lindeman, d'Alexandrie.

1932 M. Alfred Reinhart, d'Alexandrie.

BULLETIN

DE LA

SOCIÉTÉ ROYALE ENTOMOLOGIQUE D'ÉGYPTE

Liste des Membres de la Société en 1932

(Les noms des Membres fondateurs sont précédés de la lettre F)

Membres Honoraires

1908 MM. Alluaud (Charles), Les Ouches, à Crozant (Creuse), France.

» Bugnion (Dr. Edouard), « La Luciole », Avenue Pasteur, Aix en Provence (Bouches du Rhône), France.

» Buysson (Robert du), St. Rémy la Varenne, par St. Mathurin (Maine et Loire), France.

1924 Ebner (Prof. Richard), Beethovengasse 3, Vienne IX, Autriche.

1923 Garcia Mercet (Ricardo), Museo Nacional de Ciencies Naturales, Hipodromo, Madrid, Espagne.

1924 Horvath (Dr. Geza), Musée National Hongrois, Budapest, Hongrie.

1909 Joannis (l'Abbé J. de), 7, rue Coëtlogon, Paris (6e), France.

» Marchal (Dr. Paul), Directeur de la Station Entomologique de Paris, 45, rue de Verrières, à Antony (Seine), France.

1917 Navas (R. P. Longin), Colegio del Salvador, Apartado 32, Zaragoza, Espagne.

1929 Parent (l'Abbé O.), Institution Ste Marie, Aire sur la Lys, Pas de Calais, France.

» Peyerimhoff (P. de), 87, Boulevard Saint-Saëns, Alger, Algérie.

1908 Pic (Maurice), à Digoin (Saône et Loire), France.

1921 Pierre (Claude), 7 bis, rue du Loing, Paris (14e), France.

1909 Rothschild (Lord), Tring Park, Tring, Herts, Angleterre.

1929 Théry (André), Institut Scientifique Chérifien, Rabat, Maroc Occidental.

1920 Tonnoir (André), Senior Ecologist and Curator of the Entomological Research Station, Postal Box 9, Camberra City, F.C.T., Australia.

» Villeneuve (Dr. Joseph), Rue des Vignes, Rambouillet (Seine et Oise), France.

F Willcocks (F.C.), 18, Watcombe Road, Bournemouth, Hampshire, Angleterre.

Membres Correspondants

1932 Ballard (Edward), c/o Plant Protection Section, Ministère d'Agriculture, au Caire.

1923 Bergevin (Ernest de), rue Elysée Reclus, Alger, Algérie.

1921 (F) Bœhm (Rudolf), Rechte Wienzeile 83, Vienne V, Autriche.

1924 Cros (Dr. Auguste), 6, rue Dublineau, Mascara, Algérie.

1928 D'Orchymont (A.), 176, Avenue Houba de Strooper, Bruxelles II, Belgique.

1924 Falcoz (Dr. Louis), Vienne (Isère), France.

» Flower (Major Stanley Smyth), Tring, Herts, Angleterre.

1923 Gough (Dr. Lewis H.), Jagers Drift, Longhope, Bedford District, Cape Province, South Africa.

1926 Hall (W.J.), Entomologist to the British South Africa Company, B.S.A. Company Citrus Estate, Mazoe, Southern Rhodesia, South Africa.

1923 Hervé-Bazin (Prof.Dr.J.), Le Patys, par Segré (Maine et Loire), France.

1924 Hindle (Dr. Prof. Edouard), Magdelene College, Cambridge, Angleterre.

1931 Horn (Dr. Walther), Deutsches Entomologisches Institut, Gossler Str. 20, Berlin-Dahlem, Allemagne.

1923 Hustache (A.), Pensionnat St. Laurent, à Lagny (Seine et Marne), France.

1925 KIRKPATRICK (Thomas Winfrid), Gezira Research Farm, Wad Medani, Soudan.

1929 MASI (L.), Museo Civico di Storia Naturale, Genova (102), Italie.

1930 MELLOR (J.E.M.), Entomologist to the Cambridge University Horticultural Research Station, the School of Agriculture, Cambridge, Angleterre.

1926 TRAUTMANN (Dr. W.), Dionstrasse 44, Lautawerk (Preussische Lausitz), Allemagne.

1927 WILLIAMS (C.B.), 29, Queen's Crescent, Edinburg, Angleterre.

Membres Titulaires

1913 MM. ABAZA BEY (Fouad), Boîte Postale N° 63, au Caire.

1924 ABRAM (Joseph), 6, Rue Kénissa El Guédida, au Caire.

1925 AGRICULTURAL SCHOOL MIKVEH-ISRAEL, P.O. Box 185, Tel-Aviv, Palestine.

1909 ALFIERI (Anastase), Boîte Postale N° 430, au Caire.

1928 ALY EL SAYED (Abdel Aziz), Plant Protection Section, Ministère d'Agriculture, au Caire.

1924 AZADIAN (Dr. A.), Laboratoires d'Hygiène Publique, au Caire.

1908 BAHARI BEY (G.C.), 11, Rue Seif el Dine El Mahrani, Fagala, au Caire.

1928 BAHGHAT (Said), Boîte Postale N° 63, au Caire.

1929 BICHARA (Ibrahim), Plant Protection Section, Ministère d'Agriculture, au Caire.

1923 BODENHEIMER (Prof. F.S.), Directeur du Département de Zoologie Générale et d'Entomologie, Université Hébraique, Boîte Postale No. 340, Jérusalem, Palestine.

1921 BUXTON (Dr. P. A.), London School of Hygiene and Tropical Medicine, Keppel Street (Gower Street), W.C.1, Londres, Angleterre.

1912 CAPRARA (César), Caisse de la Dette Publique, au Caire.

1930 CARMIN (Dr. J.), Independent Biological Laboratories, 9, Hashahar Street, Tel-Aviv, Palestine.

1929 Cassab (Antoine), Plant Protection Section, Ministère d'Agriculture, au Caire.

1917 Casoria (Matteo), 153, Avenue de la Reine Nazli, au Caire.

F Chakour (Edgard), Compagnie des Eaux du Caire, Boulac, au Caire.

1931 Compagnie Universelle du Canal Maritime de Suez, Kasr el Doubara, au Caire.

1928 Dollfus (Robert Ph.), Museum National d'Histoire Naturelle, 57, Rue Cuvier, Paris (V^me^), France.

1919 Efflatoun Bey (Hassan C.), Professeur d'Entomologie à la Faculté des Sciences de l'Université Egyptienne, 59, Rue Hussein Pacha Kamel, Hélouan, près le Caire.

1920 Efflatoun Pacha (S.E. Mohamed), Meadi, près le Caire.

1925 Entomological Society of London, 41, Queen's Gate, South Kensington, S.W.7, London, Angleterre.

1928 Fahmy Youssef (Moustafa), Plant Protection Section, Ministère d'Agriculture, au Caire.

F Ferrante (Docteur Avocat Giovanni), 4, Rue Gohari, au Caire.

1914 Garboua (Maurice), 4, Rue Baehler, Immeuble Baehler, Kasr el Nil, au Caire.

1907 Garozzo (A.S.), Ingénieur, 3, Rue Galal, au Caire.

1930 Georgiadis Bey (Dr. N.), 20, Rue Manakh, au Caire.

1927 Ghali Pacha (S.E. Wacef Boutros), Ghizeh, près le Caire.

1908 Green (Jacques), Avocat, Rue Madabegh, au Caire.

1921 Greiss (Elhamy), Department de Botanique, Faculté des Sciences, Université Egyptienne, Abbassieh, au Caire.

1930 Hanafy Bey (Mahmoud), c/o Ministère d'Agriculture, au Caire.

1928 Hassan (Dr. Ahmed Salem), Professeur de Zoologie et d'Entomologie à l'Ecole d'Agriculture, Ghizeh, près le Caire.

1908 Hess (Dr. Ernest), 10, Rue Antikhana El Masria, Kasr el Nil, au Caire.

1932 His Majesty Stationery Office, Princes Street, Westminster, S.W.1, London, Angleterre.

1925 HOCHEIRY (Abd-El-Baki Zaki El), Conseiller à la Cour d'Appel Indigène, au Caire.

1924 HONORÉ (A.), Chimiste, Raffinerie de Hawamdieh, Haute-Egypte.

» HOURIET (Raoul), Conseiller à la Cour d'Appel Mixte, à Alexandrie.

1927 HOUSNY (Mahmoud), Plant Protection Section, Ministère d'Agriculture, au Caire.

F INNES BEY (Dr. Walter), Meadi, près le Caire.

1928 IZZET BEY (Mohamed), 14, Midan el Daher, au Caire.

1915 JULLIEN (Joseph), 248, Rue de Thèbes, Cleopâtra les Bains, via Sidi Gaber.

1927 KAMAL (Dr. Mohamed), Plant Protection Section, Ministère d'Agriculture, au Caire.

1922 KAOURK (Elias A.), Expert Comptable, 9, Rue Borsa (Tewfikieh), au Caire.

1926 KASSEM (Mohamed), Plant Protection Section, Ministère d'Agriculture, au Caire.

1923 KING (H. H.), Government Entomologist, Wellcome Tropical Research Laboratories, Khartoum, Soudan.

» LABORATOIRES D'HYGIÈNE PUBLIQUE, Bibliothèque de la Section d'Helminthologie, au Caire.

1931 LAND BANK OF EGYPT, Boîte Postale N° 614, à Alexandrie.

1921 LIMONGELLI (Mme C. Artin D.), 13, Rue el Nemr, au Caire.

1928 LINDEMAN (Hugo), Boîte Postale N° 357, à Alexandrie.

1931 LYCÉES FRANÇAIS, 2-4, Rue Haouaiati, au Caire.

1928 MAHFOUZ PACHA (S.E. Rachouan), 33, Rue Amir Said, Zamalek, au Caire.

1932 MALOUF (N. S. Royston), 18, Rue Chérif Pacha, Héliopolis, près le Caire.

1927 MANSOUR (Dr. Kamel), Conférencier, Département de Zoologie, Faculté des Sciences, Abbassieh, au Caire.

1921 MISTIKAWY (Abdel Megid El), Plant Protection Section, Ministère d'Agriculture, au Caire.

1926 Mortera (Aldo), Savoy Chambers, Boîte Postale No. 739, au Caire.

1929 Mosseri (Henri), 25, Rue Cheikh Abou El Sebaa, au Caire.

1931 Papayoannou (Prof. Dr. Théodore), Hôpital Papayoannou, Boulac El Dacrour, Ghizeh, près le Caire.

1911 Petroff (Alexandre), 15, Boulevard Saad Zagloul, à Alexandrie.

1908 Piot Bey (J.B.), 7, Rue Deir El Banat, au Caire.

1928 Priesner (Prof. Dr. H.), Plant Protection Section, Ministère d'Agriculture, au Caire.

1932 Reinhart (Alfred), Boîte Postale No. 997, Alexandrie.

» Rifaat (Ahmed), B. Sc., 29, Rue Abdel Rahman Bey Nasr, Zeitoun, près le Caire.

» Rivnay (E.), Institute of Agriculture and Natural History, Agricultural Experiment Station, P. O. Box 121, Tel Aviv, Palestine.

1927 Rizk (Attia), Plant Protection Section, Ministère d'Agriculture, au Caire.

» Sabitt (Dr. Méd. Mahgoub), Sayeda Zenab, au Caire.

1922 Shahine Pacha (S.E. le Dr. Mohamed), Sous-Secrétaire d'Etat à l'Hygiène Publique, au Caire.

1924 Shaw (Fred), Meadi, près le Caire.

1928 Sidky Pacha (S.E. Mahmoud), Gouverneur du Caire, au Caire.

1921 Société Royale d'Agriculture, Laboratoire d'Entomologie de la Section Technique, Boîte Postale N° 63, au Caire.

1931 Soleri (Dr. Umberto), Chef de l'Observatoire Phytopathologique du Gouvernement des Iles Italiennes de l'Egée, Rhodes (Egée).

1928 Soliman (Dr. Labib Boutros), Plant Protection Section, Ministère d'Agriculture, au Caire.

1926 Tewfik (Mohamed), Département de Zoologie, Faculté des Sciences, Université Egyptienne, Abbassieh, au Caire.

1923 Vallet (Jean), Avocat, Immeuble Rabbat, Avenue Fouad Ier, au Caire.

1930 Verucci Bey (Ernest), Palais d'Abdine, au Caire.

1929 Vogt (Carl), 5, Rue Nemr, Boîte Postale N° 1589, au Caire.

1925 Waly Pacha (S.E. Gafar), Matarieh, près le Caire.

1926 Waly (Dr. Mohamed), Université Egyptienne, Palais Zaafaran, Abbassieh, au Caire.

1912 Wilkinson (Richard), National Bank of Egypt, Kasr el Nil, au Caire.

1926 Zaki (Ahmed), Junior Entomologist, Plant Protection Section, Ministère d'Agriculture, au Caire.

1915 Zoological Service, Ghizeh, près le Caire.

1926 Zulficar (Samir), Maadi, près le Caire.

Institutions Scientifiques et Bibliothèques

Afrique Occidentale Française :

Monsieur le Gouverneur Général (Comité d'Etudes Historiques et Scientifiques), Dakar, Sénégal.

Afrique du Sud :

South African Museum, P.O. Box 61, Cape Town.

Department of Agriculture of the Union of South Africa (The Agricultural Journal of the Union of South Africa), Pretoria.

Department of Agriculture of the Union of South Africa, Division of Entomology, P.O. Box 513, Pretoria.

Algérie :

Société d'Histoire Naturelle de l'Afrique du Nord, Faculté des Sciences d'Alger, Alger.

Allemagne :

Deutsche Entomologische Gesellschaft, 43, Invalidenstrasse, Berlin N° 4.

Senckenbergischen Naturforschenden Gesellschaft, Bibliothek, Viktoria Allee 9, Frankfurt A/M.

Zoologisches Museum der Universität, 43, Invalidenstrasse, Berlin, N° 4.

Angleterre :

The Imperial Institute of Entomology, Review of Applied Entomology, 41, Queen's Gate, London S.W.7.

Zoological Museum, Novitates Zoologicæ, Tring Park, Tring, Herts.

The Apis Club (The Bee World), Brockhill, London Road, Camberley, Surrey.

The Philosophical Society of Cambridge, Zoological Laboratory, The Museums, Cambridge.

Argentine :

Instituto Biologico de la Sociedad Rural Argentina, Buenos Aires.

Sociedad Cientifica Argentina, Cevallos 269, Buenos Aires.

Sociedad Entomologica Argentina, Museo Nacional de Historia Natural, Buenos Aires.

Museo Nacional de Historia Natural « Bernardino Rivadavia », Casilla de Correo N° 470, Buenos Aires.

Ministerio de Agricultura (Boletin del Ministerio de Agricultura de la Nacion), Bibliotheca, 974, Paseo Colon, Buenos Aires.

Autriche :

Intendanz des Naturhistorischen Museums, Burgring 7, Vienne I.

Zoologisch-Botanische Gesellschaft, III, Mechelgasse 2, Vienne.

Koleopterologische Rundschau (MM. Winkler & Wagner), Dittesgasse Nr. 11, XVIII, Vienne.

Australie :

The Australian Museum (Records of the Australian Museum), Sydney, N.S.W.

The Entomologist's Office, Department of Agriculture, Sydney, N.S.W.

The Public Library, Museum, and Art Gallery of South Australia, Box 386 A, G.P.O., Adelaide, South Australia.

Belgique :

Société Entomologique de Belgique, 31, Rue Vautier, Bruxelles.

Lambillionea, Revue Mensuelle de l'Union des Entomologistes Belges (M. F. Derenne), 90, Avenue Louis Lepoutre, Ixelles (Bruxelles).

Annales du Musée du Congo Belge, Tervueren.

Association des Ingénieurs sortis de l'Institut Agronomique de l'Etat, à Gembloux, 35, Avenue des Volontaires, Anderghem-Bruxelles.

Brésil :

Museu National do Rio de Janeiro, Rio de Janeiro.

Instituto Biologico, Bibliotheca, Caixa Postal 2821, Sâo Paulo.

Estaçao Experimental de Algodao (Cotton Experiment Station), Ceara.

Instituto Oswaldo Cruz, Caixa de Correio 926, Rio de Janeiro.

Revista de Entomologia, Caixa Postal 1302, Sao Paolo.

Bulgarie :

Institutions Royales d'Histoire Naturelle, Musée Royal d'Histoire Naturelle, Palais Royal, Sofia.

Société Entomologique de Bulgarie, Musée Royal d'Histoire Naturelle, Palais Royal, Sofia.

Société Bulgare des Sciences Naturelles, Musée Royal d'Histoire Naturelle, Palais Royal, Sofia.

Canada :

Entomological Society of Ontario (The Canadian Entomologist & Reports), Guelph, Ontario.

Library, Department of Agriculture, West Block, Ottawa.

Department of Agriculture, Entomological Branch, Ottawa.

Nova Scotian Institute of Science, Halifax.

Chili :

Museo de Historia Natural y Etnografia, Conception.

Anales de Zoologia Aplicada, Casilla 2974, Santiago.

Revista Chilena de Historia Natural, Casilla 2974, Santiago.

Chine :

The Lingnan Science Journal, Lingnan University, Canton.

Bulletin of the Biological Department, Science College, Sun Yat-Sen University, Canton.

Bureau of the International Exchange, Academia Sinica, 331, Avenue du Roi Albert, Shanghai.

Bureau of Entomology of the Chekiang Province, West Lake, Hangchow.

Chypre :

The Cyprus Agricultural Journal (The Office of the Government Entomologist), Nicosia.

Danemark :

Entomologisk Forening, Zoologisk Museum, Krystalgade, Copenhague.

Egypte :

Bibliothèque du Cabinet de S.M. le Roi, Palais d'Abdine, au Caire.

Ministère d'Agriculture, Bibliothèque de la Plant Protection Section, Ghizeh, près le Caire.

Société Royale d'Agriculture, Bibliothèque de la Section Technique, Boîte Postale N° 63, au Caire.

Union des Agriculteurs d'Egypte, 25, rue Cheikh Abou El Sebaa, au Caire.

The Bee Kingdom, 9, rue El Moez, Matarieh, près le Caire.

Ministère d'Agriculture, Bibliothèque, Ghizeh, près le Caire.

Al-Fellaha, Boîte Postale N° 2047, au Caire.

Société Royale de Géographie d'Egypte, 45, rue Cheikh Youssef, au Caire.

The Journal of the Egyptian Medical Association, 5, rue El Sanafiri, Abdine, au Caire.

Société Royale d'Economie Politique, de Statistique et de Législation. Boîte Postale N° 732, au Caire.

Institut d'Egypte, 1, rue Cheikh Rihan, au Caire.

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Director General de Agricultura (Revista del Departamento de Agricultura), Quito.

Espagne :

Instituto Generale y Técnico de Valencia, Valencia.

Instituto Nacional de Investigaciones y Experiencias Agronomicas y Forestales, Servicio Fitopatologico Agricola, Estacion de Fitopatologia Agricola, La Moncloa, Madrid (8).

Junta para ampliacion de Estudios, Duque de Medinaceli, 4, Madrid.

Junta de Ciencies Naturales de Barcelona, Museo Municipal, Barcelona.

Academia de Ciencias y Artes de Barcelona, Barcelona.

Sociedad Espanola de Historia Natural, Museo Nacional de Ciencias Naturales, Hipodromo, Madrid.

Etats-Unis :

Buffalo Society of Natural Sciences, Buffalo Museum of Science, Humboldt Park, Buffalo, New-York.

University of Illinois Library, Urbana, Illinois.

Library of the American Museum of Natural History, Central Park, New-York City.

Pacific Coast Entomological Society (The Pan-Pacific Entomologist), California Academy of Sciences, Golden Gate Park, San Francisco, California.

Academy of Natural Sciences, Entomological Section, Lagon Square, Philadelphia.

American Entomological Society, Lagon Square, Philadelphia.

United States Department of Agriculture, Washington, D.C.

United States National Museum, Smithsonian Institution, Washington, D.C.

Museum of Comparative Zoology, Cambridge, Mass.

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Pennsylvania State Health Department, Pennsylvania.

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Graduate School of Tropical Agriculture and Citrus Experimental Station, Riverside, California.

Brooklyn Museum, Eastern Parkway, Brooklyn, New-York.

Wisconsin Academy of Sciences, Arts, and Letters, Madison, Wisconsin.

Library, Minnesota Agricultural Experiment Station, University Farm, Saint Paul, Minnesota.

Coleopterological Contributions (Dr Frank J. Psota), 4046 West, 26th Street, Hawthorne Station, Chicago, Illinois.

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Societas Entomologica Helsingforsiensis, Helsingfors.

Societas pro Fauna et Flora Fennica, Kaserngatan 24, Helsingfors.

Societas Zoolog.-botanica Fennica Vanamo, Ritari-Str. 6, Helsinki.

France :

L'Echange, Revue Linnéenne, Digoin (Saône et Loire).

Revue Scientifique du Bourbonnais et du Centre de la France, 22, Avenue Meunier, Moulins (Allier).

Société d'Etudes des Sciences Naturelles de Nîmes, 6, Quai de la Fontaine, Nîmes (Gard).

Société Linnéenne de Bordeaux, Athénée, 53, rue Des Trois Conils, Bordeaux.

Société Linnéenne de Lyon, 33, rue Bossuet (Imm. Municipal), Lyon.

Société des Sciences Naturelles de l'Ouest de la France, Nantes (Loire Inférieure).

Association des Naturalistes de Levallois-Perret, 153, rue du Président Wilson (Domaine de la Planchette), Levallois-Perret (Seine).

Société Linnéenne du Nord de la France, 81, rue Lemerchier (M. Pauchet), Amiens.

Société d'Histoire Naturelle de Toulouse, Bibliothèque Universitaire de la Faculté de Médecine, Allée Saint-Michel, Toulouse.

Société Entomologique de France, Hôtel des Sociétés Savantes, 28, Rue Serpente, Paris (6^{me}).

Société d'Etudes Scientifiques de l'Aude, Carcassone (Aude).

Station Entomologique de Paris, 16, Rue Claude Bernard, Paris (5^{e}).

Museum National d'Histoire Naturelle, Bibliothèque, 8, Rue de Buffon, Paris (V^{e}).

Société de Zoologie Agricole (Revue de Zoologie Agricole et Appliquée), Faculté des Sciences, Institut de Zoologie, Cours de la Marne, Bordeaux.

Hollande :

Nederlandsche Entomologische Vereeniging, p/a Zoölogisch Museum, Amsterdam.

Landbouwhoegeschool Laboratorium voor Entomologie, Berg 37, Wageningen.

Hongrie :

Musei Nationalis Hungarici, Magyar Nemezti Museum, Budapest 80.

Indes :

Zoological Survey of India (Records of the Indian Museum), Indian Museum, Calcutta.

Madras Government Museum, Connemara Public Library, Egmore, Madras.

Agricultural Research Institute, Library, Pusa, Bihar.

Agricultural Research Institute, Entomological Section, Pusa, Bihar.

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Italie :

Museo Civico di Storia Naturale, 9, Via Liguria, Genova (102).

Societa dei Naturalisti in Napoli, Reale Università, Via Mezzocannone, Napoli.

Società Entomologica Italiana, Museo Civico di Storia Naturale, 9, Via Brigata Liguria, Genova (102).

Accademia Scientifica Veneto Trentino Istriana, Padova (Veneto).

Società Adriatica di Scienze Naturali, 4, Piazza degli Studi, Trieste.

La Reale Stazione di Entomologia Agraria (Redia), 19, Via Romana, Firenze.

La Reale Stazione Sperimentale di Gelsicoltura e Bachicoltura di Ascoli Piceno.

Istituto Zoologico della Reale Universita di Napoli, Napoli.

Laboratorio di Zoologica Generale e Agraria, Napoli (Portici).

Bibliothèque de l'Institut International d'Agriculture (Moniteur International de la Protection des Plantes), Villa Umberto I, Rome.

Società italiana di Scienze Naturali, Palazzo del Museo Civico di Storia Naturale, Corso Venezia, Milano.

La Reale Universita di Genova (Bolletino dei Musei di Zoologia e Anatomia comparata), Genova.

Società dei Naturalisti e Matematici di Modena, presso la Reale Universita, Modène.

Laboratorio di Entomologia del Reale Instituto Superiore Agrario di Bologna, 6, Via Filippo Re, Bologna (125).

Società per gli Studi Trentini, Studi Trentini di Scienze Naturali, Trento.

Instituto Agricolo Coloniale Italiano, 9, Viale Principe Umberto, Firenze.

Japon :

Saghalien Central Experiment Station, Konuma, Saghalien.

Departement of Agriculture, Government Research Institute, Taihoku, Formosa.

The Kansai Entomological Society, Cho Teranishi : 221 Ikue-chc, Higashinari-ku, Osaka.

Maroc :

Société des Sciences Naturelles du Maroc, Institut Scientifique Chérifein, Rabat.

Mésopotamie :

The Director of Agriculture, Baghdad.

Mexique :

Junta Nacional Directora de la Campana contra la Langosta (Junosta), Biblioteca, Departamento Directivo Veracruz.

Oficina Federal para la Defensa Agricola, Departamento de Investigacion, Secretaria de Agricultura y Fomento, San Jacinto, D.F.

Universidad Nacional Autonoma de Mexico, Instituto de Biologia, Chapultepec (Casa del Lago), Mexico, D.F.

Norvège :

Tromso Museum Library, Tromso.

Panama (République de) :

Departamento Seccional de Agricultura (Boletin Agricola), Panama

Pologne :

Musée Zoologique Polonais, Krakowskie Przedmiescie 26/28, Varsovie.

Société Polonaise des Entomologistes, Rutowskiego 18, Lwow.

Société Botanique de Pologne, Varsovie.

Portugal :

Société Portugaise des Sciences Naturelles. Instituto de Fisiologia, Faculdade de Medicina, Lisbonne

Museum Zoologique de l'Université de Coimbra, Largo Marquês de Plombal, Coimbra.

Roumanie :

Société Transylvanienne des Sciences Naturelles (Siebenbürgischer Verein für Naturwissenschaften), Hermannstadt, Sibiu.

Academia Romana, Bibliothèque, Calea Victoriei, 125, Bucarest.

Russie :

Société Entomologique de Russie (Revue Russe d'Entomologie), Musée Zoologique de l'Académie des Sciences, Léningrad.

Bibliothèque du Musée Zoologique de l'Académie des Sciences de l'Ukraine, 15, Rue Lenine, Kieff.

Société des Naturalistes de Kief, c/o Société des Relations Culturelles entre l'Union des R.S.S. et l'étranger, Mal. Nikitskaia, 6, Moscou 69.

Institut des Recherches Biologiques de l'Université de Perm, Perm. Zaimka.

Library, Institute for Plant Protection, Bureau of Applied Entomology and Zoology, 10, Elagin Ostrov, Léningrad.

Rédaction du Journal « Plant Protection », 7, Rue Tschaikovsky, Leningrad.

Institute for controlling Pests and Diseases, 7, Tschaikovsky Str., Leningrad 28.

Suède :

K. Swenska Vetenskapsakademien i Stockholm, Stockholm.

Entomologiska Foreningen, Brottninggatten 94, Stockholm.

Göteborgs Kungl. Vetenskaps-och Vitterhets Samhälles, Göteborg.

Centralanstalten för försöksväsendet pa jordbruksomradet (Entomologiska Afdelningen, Experimentalfältet), Stockholm.

Suisse :

Bibliothèque de la Société Entomologique Suisse, Musée d'Histoire Naturelle, Berne.

Zentralbibliotek, Naturforschenden Gesellschaft, Zurich.

Tcheco-Slovachie :

Société Entomologique Tcheco-Slovaque (Casopis), Karlov 2028, Prague II.

Section Entomologique du Musée National de Prague (Sbornik), Vaclavské namesti II.-1700, Prague.

Uruguay (République de l') :

Escuela de Veterinaria del Uruguay (Anales de la Escuela de Veterinaria del Uruguay), Itazaingo 1461, Montévideo.

Yougo-Slavie :

Societas Entomologica Jugoslavica (Glasnik), Studenicka ulica N° 55, Belgrade.

N.B. — Pour changement d'adresse, erreurs ou omissions, s'adresser à M. le Secrétaire Général de la Société Royale Entomologique d'Egypte, Boîte Postale N° 430, au Caire.

Séance du 19 Janvier 1932

Présidence de S.E. le Dr. Mohamed Shahine Pacha, *Président.*

Dons divers:

La Société a reçu :

1° De Monsieur le Dr. Hille Ris Lambers, de Wageningen (Hollande) : six brochures de ses travaux sur les Aphidiens.

2° De Monsieur T. W. Kirkpatrick : un tiré à part de son travail « *Further studies on leaf-curl of Cotton in the Sudan* ».

3° De Monsieur Ismail Chaker Bey : un exemplaire naturalisé du palmipède *Erismatura leucocephala* Scop.

4° De S.E. Said Zulficar Pacha : deux exemplaires naturalisés de *Erismatura leucocephala* Scop. et un exemplaire naturalisé de *Charadrius apricarius* Linné (pluvier doré).

5° De Monsieur Edouard Gantès : un aigle impérial naturalisé, monté sur socle imitation rocher.

6° De Monsieur Alfred Reinhart, d'Alexandrie : une grande armoire en chêne à 42 tiroirs contenant une très importante collection de Ténébrionides paléarctiques et un lot d'ouvrages destinés à la Bibliothèque.

Le Conseil remercie les généreux donateurs.

Echange des Publications:

Se font inscrite :

1° L'Institute for controlling Pests and Diseases, Leningrad, Russie.

2° L'Instituto Biologico de Defesa Agricola e Animal, Saô Paulo, Brésil.

3° La Revue Zoologique Agricole de la Faculté des Sciences de l'Université de Bordeaux, France.

4° La Landbouwhoegeschool voor Entomologie, Wageningen, Hollande.

5° La Faculté des Sciences (Université Egyptienne) du Caire.

6° La Faculté de Médecine (Université Egyptienne) du Caire.

7° La Revista de Entomologia, Saô Paulo, Brésil.

8° La Wisconsin Academy of Sciences, Arts, and Letters, Madison, Wisconsin, Etats Unis d'Amérique.

Nominations:

Le Conseil confère à Monsieur ALFRED REINHART le titre de Membre bienfaiteur de la Société.

Sont nommés membres titulaires: Messieurs N. S. ROYSTON MALOUF, AHMED RIFAAT, E. RIVNAY (de Tel Aviv, Palestine), proposés par Messieurs H. C. EFFLATOUN Bey et A. ALFIERI.

Nécrologie:

Le Secrétaire Général fait part du décès de Mtre E. PEZZI Bey, membre titulaire de la Société depuis 1908.

Communications

Contributions towards a knowledge of the Thysanoptera of Egypt, V

(with 5 illustrations)

by H. PRIESNER.

11. A new genus of the family Thripidae.

Thamnothrips, gen. nov.

Body short, like *Dendrothrips*. Abdomen broad; head transverse, only slightly doubly sinuated in front, somewhat convex in the middle. Antennae 8-segmented, style 2-segmented. Head without bristles. Mouth-cone longer than in *Dendrothrips*, bent downwards, maxillary palpi 2-segmented. Prothorax practically without bristles. Wings rather broad, normally shaped, sides equally pointed but scale very narrow; veins very distinct, a cross vein in middle of wing from upper vein to costa, as well; costal bristles indistinct at base of wing, bristles on veins small and tiny. Tergites 1-8 with a pair of bristles in the middle near base, which are very close to each other on segments 1-5. Bristles on tip of abdomen short. Legs, including tarsi, slender.

TYP. GEN.: *Thamnothrips bimaculatus*, sp.n.

Near *Dendrothrips*, easily distinguished from this genus by the shape of the wings and the mouth cone, the slenderer antennae and tarsi. An intermediate type between *Dendrothrips* and *Anaphothrips*.

Thamnothrips bimaculatus, sp. nov.

(Fig. 1 and 2)

Female : Colour pale greyish yellow, pterothorax slightly shaded with orange, head and prothorax lightest, body and legs with the following darkenings : Line on hind margin of head brown, frons and underside of labium pale grey, tip of rostrum and pharyngeal parts blackish ; pronotum pale yellowish with some irregular and indistinct grey spots ; mesonotum grey at margins, metascutum and pleurae with grey markings ; abdominal segments

1

Fig. 1

Thamnothrips bimaculatus

gen. et sp. nov.

Antenna of the female.

greyish shaded, so that only the hind margins of them remain yellow, these being spot-like enlarged at sides ; segment 9 pale in distal half, 10 little shaded. Legs whitish yellow, all femora with broad, grey ring (cloudy), fore tibiae as well, middle and hind tibiae light at base, the remaining pale on the outer margin, the inner shaded up to the middle. Tarsi pale yellow, tip black. Antennae almost unicolorous, grey, segment 1 whitish, 2 dark grey, stem of 3 almost clear. Wings nearly hyaline, fore wings with a pale grey spot just before the branch (lower vein), reaching the costa but not the hind margin of the wing.

Head transverse, length 87-93 μ, with frontal projection 105 μ; eyes, length 70 μ, indistinctly setose; head in front somewhat hump-like protruding, within the eyes only slightly sinuated. Ocelli normal, with orange pigment. Cheeks short, probably converging posteriorly. Maxillary palpi grey, segment one less than half the length of 2. Mouth-cone longer than in *Dendrothrips*, strongly downward bent. Antennae slender, length 235 μ, segment 1 small, 2 big, barrel-shaped, 3 comparatively short, 5 comparatively long, rather broadly truncate at apex, 6 longest but narrower than 5, style slender, its segments of little difference in their length; segments 3 and 4 with forked sense cones. Length of segments : 14(22), 36(25), 36(16), 34(15), 36(15), 45(13), 11(7), 13(4) μ. Prothorax strongly transverse, length 110 μ, practically without bristles, also those on hind angles rudimentary, exceedingly

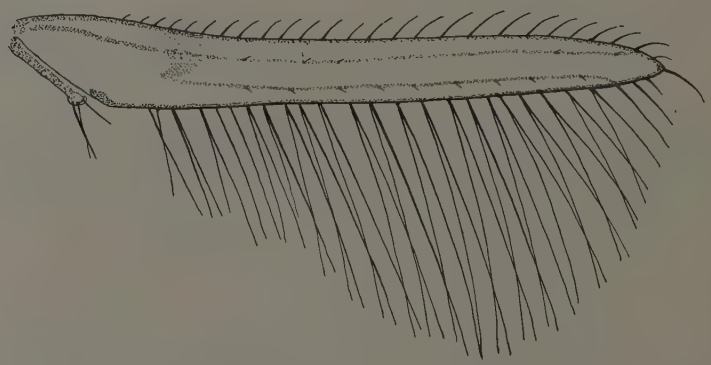


Fig. 2. — *Thamnothrips bimaculatus*, gen. et sp. nov.: Wing of the female.

small, attached, whitish. Pronotum without distinct sculpture. Pterothorax broad, 275 μ, notal plates without distinct sculpture. Wings length 0.78 - 0.8 mm, width beyond base about 93 μ, across middle 76-78 μ, with very distinct but almost colourless veins; costa with 29 bristles commencing beyond base, and being comparatively short but longer towards tip of wing; upper vein with 7+1+2+2 bristles the last four of which have to be considered as distals; lower vein with 11 bristles; veins distinct. Abdomen particularly at sides with indistinct cross wrinkles, segments 1-5 with a pair of bristles in the middle of base which are situated close together; from segment 6 these bristles are more widely separated, on 8 their distance is 34 μ already; segment 8 without comb; tergit 9 with three pairs of short straight, backward directed bristles, the length of which is 53, 56, and 45 μ, respectively; bristles on segment 10 tender and short, b.1, 30 μ. Legs rather weak, femora and tibiae somewhat wrinkelled, tarsi long and slender, hind tarsi about 80 μ in length; fore and middle tarsi slightly tapering towards apex; hind tibiae with

a row of tiny scattered bristles. — Total body length (normally extended) : 1.29 mm.

HABITAT : 1 ♀, Egypt, Wadi Digla near Cairo, 28.3.1930, swept from desert bushes.

12. A further new Mycterothrips, and a key of the species.

Mycterothrips acaciae, sp. n.

FEMALE : Pale yellow, thorax and sides of the abdomen somewhat orange, extreme tip of abdomen orange ; legs pale yellow, femora and tibiae at their margins faintly and indistinctly shaded with grey ; wings scarcely shaded with pale greyish yellow ; ocelli crimson ; segments 1 and 2 of the antennae pale yellow, 2 greyish, 3 and 4 yellow in basal third, grey in the remaining parts, 5 pale at extreme base or in basal third, the remaining segments dark. Bristles on body, wings, and legs dark.

Head short dorsally, length only about 53 μ, with across eyes 95 μ, cheeks straight, a little narrowed towards base, eyes coarsely facetted, with some single bigger yellow facettes, distinctly pilose ; interocellar bristles about 34 μ in length, inserted normally ; mouthcone exceptionally long, in specimens with contracted segments reaching the middle of mesosternum ; length of head including mouth-cone 252-240 μ ; maxillary palpi very long, slender, much slenderer as in *M. laticauda* Trybom, measurements of segments, 25, 13, and 20, respectively ; segment 1 therefore distinctly longer than 3, segment 2 somewhat bent ; length of labial palpi 14 μ ; antennae length 225 μ, measurements of joints, 20-21(21), 31-34(21), 36-41(15), 34-38(16), 25-28(16), 38-41(17), 6-7(7), 13-15(4) μ ; forked sense cones on segments 3 and 4 strongly bent, well developed ; length of prothorax about 126 μ, width only 115 μ ; the two bristles on hind angles about equal in length, 28-36 μ, besides, two pairs of hind marginals present, the inner of which a little longer (17μ) than the outer, fore legs simple, fore tarsi very slender ; width of mesothorax 180 μ ; wings length 605-623 μ ; bristles on wings moderately long, on costa I am counting 25, on the upper vein, 4+3 basals and 2 distals, on the lower vein 11-13 bristles ; the scale shows on fore margin 5, at the end of the median vein (end of basal third of scale) 1 bristle ; segment 8 of the abdomen with fringe which is not very dense and distinct but composed of long hairs ; bristles on segment 9, dorsal pair, 40 μ, those on hind margin, 62, 76, and 22, respectively, bristles on segment 10, 76, and 64-67, respectively ; split on segment 10 not visible.—Total body length (contracted) : 0.9 mm.

I have seen three females of this species, 1 from Kom Ombo, 5.3.1931, on wheat (*Triticum*), the two others from Amriah (Mariut), 26.7.31, in flowers of *Acacia nilotica*.

One cannot confuse this species with *M. echii* Pr. Bull. Soc. Roy. Ent. Egypte, 1931, p. 129) which has 6 to 8 bristles on the lower vein of the fore wings, shorter antennae, and shorter mouth-cone, and the hind marginal bristles on the prothorax of which are unequal in length; the new species is only allied to *M. laticauda* Tryb., and *M. flavens* Moult.; the first mentioned species has the maxillary palpi shorter and less slender, the 1st and 2nd segments of which are equal in length; *M. flavens*, however, has longer antennae.

A key of the hitherto known species of the genus may be useful.

Mycterothrips Trybom.

1'' Lower vein with at least 6 bristles.
2'' Bristles on hind angles of prothorax unequal in length, the outer shorter than the inner one; lower vein with only 6 to 8 bristles; antennae short, measurements from segment 3 :34, 28, 25, 39, 7, 14 μ ..... **echii, Pr.**
2' Bristles on hind angles of prothorax of equal length; lower vein with 10 to 14 bristles.
3'' Upper vein with 4 distal bristles; antennae longer, measurements of segments from segment 3: 48, 48, 36, 48, 11, 15 μ; general colour brown ..... **longirostrum, Jones**
3' Upper vein with 2 distal bristles.
4'' Antennae shorter.
5'' Segment 1 and 3 of the maxillary palpi of equal length; segments 1 to 3 of the antennae pale ..... **laticauda, Tryb.**
5' Segment 1 of the maxillary palpi longer than 3; segment 2 and 3 of the antennae shaded with grey ..... **acaciae, sp. n.**
4' Antennae longer, lengths of segments from 3rd, 45, 45, 27, 48, 9, 15 μ ..... **flavens, Moult.**
1' Lower vein at the most with 4 bristles.
6'' Wings with cross-bands ..... **n. sp.**, ined. from India.
6' Wings without bands ..... **setiprivus, Karny.**

13. A Phloeothripid from Abutilon hitherto not recorded from Egypt.

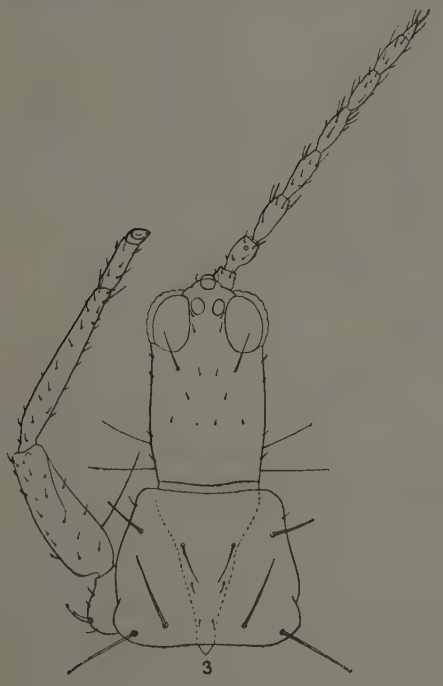
Dolichothrips varipes, Bagnall.

(Fig. 3 and 4)

Female : Brownish black, with reddish tint, red pigment cells occupying the whole body except the extremities. Femora dark, fore femora at extreme apex somewhat paler, fore tibiae including tarsi clear lemon yellow, middle and hind tibiae dark, the former with about the distal third, the latter at apex, pale yellow; middle and hind tarsi except the "plate" pale yellow. Bristles on body blackish, wings clear, plate round basal bristles very faintly

shaded, basal bristles as well; antennal segments 1 and 2 dark, 2 somewhat paler at apex, 3 to 7 clear lemon yellow, 8 shaded with grey.

Body slender. Head length from eyes 250 μ, including interantennal projection 265 μ, width across eyes 155 μ; cheeks parallel, somewhat constricted at base, front ocellus on a hump that reaches about the level of the interantennal projection; eyes length laterally 93 μ; hind ocelli in front of a line drawn across middle of eyes; mouth-cone very long, pointed, even in strongly distended specimens, reaching beyond the base of the prosternum; length of head + mouth—cone 520 μ; maxillary palpi very long, segment 1



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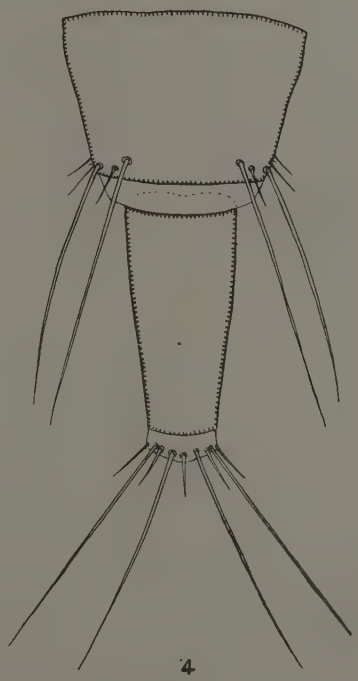

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Fig. 3. — *Dolichothrips varipes* Bagn.: Head and prothorax of the female.
Fig. 4. — *Dolichothrips varipes* Bagn.: End of the abdomen of the female.

as long as wide (11 : 11 μ), segment 2, 81 : 8 μ; postocular bristles well developed, 48 μ, directed upwards, dark, whitish at tips where they are somewhat blunt, their distance from each other 78 μ; antennae length 415 μ; measurements of segments: 25(b.31,a.27), 48-50(28), 67-70(25-26), 70(27), 64(22), 59-62(22), 48(19), 28(11) μ; sense area on segment 2 near apex of it, segment 3 at least 2.6 times as long as broad, with two tiny sense cones, segment 4 with four, segment 5 and 6, each with $1+1+^1$, segment 7 with 1 dorsally: seg-

ments 5 and 6 obliquely truncate at apex, segment 8 conical, broadest at base, though somewhat but little narrower than segment 7 at apex; prothorax conical, strongly tapering anteriorly, length 138-147 μ, width 242 μ, including coxae 286 μ; bristles on fore angles well developed, about 34 μ, postero-laterals 67 μ, all dark with opening at white tip; mesothorax width 346-363 μ; length of wings 0.86 mm.; wings narrow, distinctly somewhat constricted beyond middle, with 5-8 double fringe hairs; basal bristles 1 and 2 knobbed, 3 bent, long, almost pointed, their lengths, 59, 62, and 112-120 respectively; legs very slender; bristles on segment 9 of the abdomen: 154-168, 140-154 μ, hair-like, pointed; tube length dorsally 143, laterally 148 μ, width across base 76, at tip 45 μ; terminal hairs about 146, only at base dark.—Total body length (distended): 2.2-2.5 mm.

Male: Hardly different from female; segment 7 of the antennae cloudily darkened; head length 250, greatest width, across eyes 156 μ; antennae length 433 μ; measurements of segments from 3rd: 73(24), 76(24), 69(21), 63(20), 49(18), 28(11) μ; width of prothorax with coxae 250, without them 208 μ; length of tube, dorsally 140, basal width 64, apical width 43 μ; but two pairs of long bristles, 155 μ, dorsally on segment 9, the "spur" is a very tender small bristle, 17 μ. — Total body length (distended): 2 mm.

Larva.

In "Treubia," VIII, Suppl. p. 233, Taf. XV, Fig. 114, I have described the larva of this species after one single shrivelled specimen from India. I am able now to replace this description by a more accurate and complete one.

Second Stage: Very markedly coloured, yellow and crimson, whereas the thorax shows a red median longitudinal streak that is tapering towards head; the whole abdomen red; the red median line still occupies nearly the posterior median third of the pronotum, strongly tapering towards apex, thus being marked in apical half of pronotum only as a thin median line; the inner third of meso- and metathorax red; segment 1 of the abdomen only above red; remarkable are the more strongly chitinized parts of the head, and the pronotum; on the former there are three broadly separated dark (brownish) plates, the frontal of which being a narrow longitudinal band between the bases of the antennae; segment 1 and basal half of 2 dark, segments 3 to 5 whitish yellow, each segment at apex indistinctly, faintly shaded, the two apical segments more deeply shaded; tips of maxillary palpi pale greyish shaded; legs yellow; pronotal plates reduced to two irregularly undulated longitudinal bands on each side; these plates can be connected near hind margin or in front, the inner part (plate) disappears already in apical third of pronotum; the points of insertion of the bristles on mesonotum, metanotum, and abdomen are narrowly shaded, besides, there are bristleless plates present, one pair on fore margin of mesonotum, another pair be-

tween (behind) b.4 and 5 of both, mesonotum, and metanotum; the dorso-lateral plates of segment 8 of the abdomen are complete, and the entire segments 9 to 11 are more strongly chitinized; bristles on body blackish.

Head dorsally distinctly longer than broad, its length including the very long mouth-cone, 277 μ; maxillary palpi long, 62-64 μ, width of segment 2: 6μ ; apex of mouth-cone dark; antennae length 329-337 μ; measurements of segments: 20(22), 36(20), 76-78(20), 60(20), 53-55(18), 36(18), 31-34(8) μ; sense cone on segment 4 only moderately long, little curved; head bristles knobbed, b.1 of 2nd row 32-34 μ, b.2 small, 11 μ; length of inner eye bristle 25-28 μ; all bristles on prothorax dark, knobbed, b.1 as well, which is comparatively long, 28 μ, situated at the end of the outer dark band, b.2 far back, 31-34 μ, b.3 39 μ, at inner edge of the outer band, b.4: 34 μ, inside the inner, thicker dark longitudinal band, b.5: 59 μ, at the basal end of the outer dark longitudinal line, b.6: 53-59, b.7: 39 μ; bristles on mesothorax 36, 39, 31-34 (even b.3 knobbed), 36, 45, 50 μ; b.1 of segment 1 of the abdomen about 42 μ, b.2: 48 μ; b.3 of segment 7: 50 μ; b.2,3 of segment 8: 48 μ; bristles on segment 9, b.1 hair-like, about 140 μ, b.2 knobbed, 53, b.3 again longer, 106, b.4 hair-like as well; terminals short, about 120 μ; segment 9 longer than broad, length 109-112, width at base 87, at apex 76 μ; segment 10, length 90-93, width across base 60, at apex 31 μ.—Total body length (distended) up to 1.66-1.73 mm.

First Stage: I have only seen one specimen of this stage; colouring as in II.stage; the dark longitudinal lines on pronotum fused to one single band, the chitinous parts of all the antennal segments pale grey, tip of mouth cone blackish; only the narrow terminal part of segment 9, and the whole of segments 10 and 11 dark, bristles not so dark as in second stage.

Length of head including mouth cone 208 μ, of maxillary palpi 48 (width 4) μ; length of antennae about 242 μ; measurements of segments, 14,25-28,34,42,36,31,39 μ; bristles on head very dark but with tiny pale tip, inner eye bristle 22 μ, b.1 of cross-row 2 much longer, bent; b.6 of pronotum 45 μ, thin, knobbed; length of lateral bristle on metathorax 31, of b.2 on abdominal segment 8: 39 μ; bristles on segment 9 long, thin, pointed, b.1,2: 85,104 μ; segment 10, length 59 μ, width basally 42 μ, apically 20 μ; anal bristles well 180 μ.

I have compared the above specimens, with paratypes of *D. varipes* Bagnall I received through the kindness of Mr. R. S. Bagnall; differences in the descriptions of both, larvae and adults are only due to the not very good preservation of the type specimens; thus the description of the larva, given by me (t.c.) may be replaced by the above one.

I discovered this species in numbers (mostly females) with some larvae on the upper and lower surface of the leaves, and on stems of the Malvaceous plant *Abutilon muticum* (Del.). The insects produce white spots on the

leaves and black dots (excreta) by sucking the sap of the epidermis ; the insect is no doubt phytophagous ; it runs very fast with the abdomen bent upward.

D. varipes was found at Thomas, near Ed-Derr in Lower Nubia, and in two places at Assouan in Southern Egypt.

Bagnall's type specimens are said to have come from India, but there is nothing known yet on neither the locality nor the host plant of this insect in India. In Bull. Ent. Res., XX, 1929, p. 73, Bagnall mentions it from the British Sudan, where it was found by Badford in April 1926, on cotton. In Egypt it has never been observed on cotton.

14. The first member of the genus Stenothrips in Egypt.

Stenothrips mareoticue, sp. nov.

(Fig. 5)

Female : Brown to blackish brown, in paler specimens the abdomen except the apex pale brown ; body pigment yellowish orange ; femora and middle and hind tibiae blackish brown, fore tibiae yellow-brown to yellowish, at margins indistinctly shaded, fore tarsi yellowish, middle and hind tarsi somewhat shaded with grey ; wings faintly shaded with greyish yellow to grey, bristles on body moderately dark, mostly brownish yellow ; joints 1 and 2 of the antennae shaded yellowish grey-brown but lighter than the three apical segments which are blackish-brown, joint 3 pale yellow, 4 yellow in basal third or only at stalk ; stalk of joint 5 paler than the remaining parts but never pale yellow.

Body slender ; head small, about as long as wide, length from eyes to hind margin about 90 μ, from interantennal projection which is fork-like from above, 98 μ, width across eyes 104 μ ; when measuring the length laterally, the head is a little longer than wide ; shape of head reminds of that of *Thrips angusticeps* Uz. or *T. tenuisetosus* Knecht. ; cheeks straight or a little widened posteriorly, occiput only with about 4 cross lines ; eyes length 48 μ, little convex, with moderately coarse facettes, very distinctly pilose ; hind ocelli at the same level as hind margin of eyes ; interocellar bristles moderately long, length about 20 μ, situated at sides of front ocellus but more like in *T. angusticeps* than in *T. tenuisetosus ;* postocellar bristles 17 μ ; anteocellars far in front of first ocellus, right at the inner margins of the eyes ; mouth-cone short, maxillary palpi two-segmented, moderately long, joint 1 : 7-8, joint 2 : 14-15 μ in length ; there is no trace of a dividing line on segment 2 of them ; antennae short, 208 μ, characterized by the short style which is at base not at all smaller than the preceeding segment at apex ; segments 3 and 4 with forked sense cones ; measurements of the joints, dorsally : 20(22), 29-31(20), 35-36(15), 31(16), 28(15), 39(17), 13-14(8) μ ; fore femora somewhat enlarged, fore tarsi short ; prothorax length 98 μ, width 145 μ ; bristles at hind angles

short, 39-42 μ, although distinctly longer than in *T. dubius* Pr. but shorter than in *T. angusticeps;* on hind margin, there is a single tiny bristle between the two angle bristles, and there are fore pairs (in exceptional cases 3 and 4) small bristles inside the posterolaterals; mesothorax width 200 μ; wings length 605 μ, width beyond base 56, across middle 42 μ; broader than in *Stenothrips graminum* Uz., in shape, and bristles similar to those of *Thrips tenuisetosus;* costa with about 23, upper vein with 4+3 basal, and 1+2 distal bristles, lower vein with 9 to 10 bristles; abdomen normal, rather slender; tergit 8 with comb the hairs of which are long and originating

Fig. 5

Stenothrips mareoticus

sp. nov.

Antenna of the female

each from a broad base, sometimes two hairs being attached to one basal plate; length of segment 10: 53-56 μ, it is split up to the basal forth; bristles on segment 9 thin, length of the dorsal one about 28 μ, the hind marginals measure 67-70, 81, and 78 μ, respectively; bristles on segment 10, 84-87, and 78 μ, resp.—Total body length: 1.16 mm. (shrivelled: 0.85 mm.).

Male: Normal length 0.9 mm. very much like the female in every respect but width of mesothorax only 165 μ; sexual characters: glandular areas present on segments 3 to 6, their shape cross-elliptical with a constriction in the middle except in that on segment 6, their expansion across,

29, 31, 28, and 22 μ, respectively; segment 8 with a rudiment of a comb, being reduced to 4 small hairs in the middle of the hind margin, which are closely pulled together; tergit 9 with a curved line of 4+2 pairs (the latter laterally and more in front), of bristles, the length of which is 22-25 μ; lateral parts of the copulation organ simple, as in *Thrips*.

Larva.

Second Stage : Very similar to the larva of *Thrips angusticeps*, deeply pale yellow, with pale grey little distinct spots on pronotum, meso- and metanotum; the pronotal spots are complete, serrate at inner margins, not divided into smaller spots or dots, as in *T. angusticeps*, a small longitudinal middle. and two lateral head plates, present; antennae pale grey except apex of segments 1 and 2, and base and apex of segment 3 which are colourless; legs grey with hyaline apical half of femora; segment 9 of abdomen pale grey with teeth darker grey; segment 10 pale grey.

Total body length up to 1 mm. Body slender; head width across eyes 67-70 μ; antennae length 137 μ; length of segments 11(b.25), 22(20), 34(22), 41(21), 7(13), 17(8) μ; antennae thick and stout, microsetulae on segments 3 and 4 present but indistinct, joint 5 much broader than long, terminal joint (6) thick, about twice as long as wide; bristles on head moderately long, length 11-14 μ, slender, pointed like the remaining bristles of the body; bristles on hind angles of the prothorax never more than 34 μ, about 28-34 μ; abdomen with cross rows of small tubercles without microsetulae; bristles on segment 9 long, bent, pointed, the laterals about 56 μ; hind margin of segment 9 with about 11 very well developed small teeth, like in *T. angusticeps*.

This larva is very close to that of *T. angusticeps* but the bristles of the prothorax are shorter, the antennae too, and the spots on the pronotum are undivided.

Habitat : I discovered numerous females, 1 male, and 2 larvae on 25.3.1931, at Dabaa (Mariut) in flowers of *Achillea santolina*, and females only on 16.3.1930, at El Hammam (Mariut), in flowers of *Chrysanthemum coronarium*.

The new species belongs into the genus *Stenothrips* because of its two-segmented maxillary palpi; at the same time it is very closely allied to *Thrips tenuisetosus* Kn., which has, however, 3-segmented maxillary palpi, besides its larger size, other position of the interocellar bristles, and longer bristles of the body; the larva shows that *T. angusticeps* too belongs to the relatives of this species. From *Stenothrips graminum*, the European "Oats Thrips", our new species is distinguished by its darker colour, especially of the tibiae, the less narrow head, and the broader wings, furthermore, in the male, by the much broader, and slenderer glandular areas of the sternites; the larva is easily distinguished by the much shorter bristles on the hind angles of the prothorax.

The influence of relative humidity upon the rate of development of the Bed Bug *C. lectularius* L. (*)

by Ezekiel Rivnay, Ph. D.

Tel-Aviv, Palestine.

The rate of starvation in bed bug larvae of the first instar is, according to Jones 1930, greatly influenced by the relative humidity and temperature. On the other hand, Headlee 1914, maintains that the « rate of metabolism in actively feeding insects with an abundant supply of succulent food is not affected by large differences in atmospheric moisture ». To learn which is the case with a blood-sucking insect, such as the bed bug when it is fed only once during each instar, was the aim of the study which is presented herewith.

Methods.

The rearing of individuals was carried on under three different temperatures, namely, 22°C, 27°C, and 32°C. Six different humidities were applied for each temperature so that there were altogether 18 combinations of temperature and relative humidity. The various humidities were obtained by means of saturated salt solutions and concentrated sulphuric acid, as follows:

Water or saturated solution of potassium sulphate yielding a relative humidity above 90 %.

Saturated solution of potassium bichromate or saturated solution of potassium bromide yielding a relative humidity between 80-90 %.

Saturated solution of sodium chloride yielding a relative humidity of about 75 %.

Saturated solution of sodium bromide yielding a relative humidity between 50-60 %.

Saturated solution of calcium chloride yielding a relative humidity from 28-32 %.

Concentrated sulphuric acid yielding a relative humidity below 10 %.

These substances were placed in small jars and after two or three hours,

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(*) Contribution of the Entomological Laboratory of Massachussetts State College, Amberst, U.S.A.

the humidity of the air in each jar was measured by means of a dewpoint apparatus (Marvin 1915). Small, open vials, containing the bugs, were suspended in these jars, which in turn were placed in the case with the constant temperature. The insects were placed in the vials immediately following their feeding and were not removed therefrom until they had molted. The exact time of feeding was recorded in every case and the hour of molting was watched as closely as possible. As mentioned, the individuals were fed only once during each molting period and this facilitated the control of the quantities of food taken by them.

The difference of the rate of metabolism of various groups was often so small that the hour, as a unit of time, proved to be more satisfactory. The data were collected every two hours and when the case required, even oftener. However, they were greatly interrupted by the night periods, and also during the day when other occupation demanded attention.

The Pre-Feeding Period.

Immediately after their hatching or molting, the writer observed that the larvae are not ready to feed; their mouthparts are soft and not suitable for drilling. During this pre-feeding period, the rate of growth is greatly retarded and development begins practically with the ingestion of a meal. Often larvae, even six weeks old, molted simultaneously with recently hatched larvae, if only they were fed at the same time.

In order to substantiate this observation, the following experiment was carried out : Bugs of the first instar were chosen so that uniformity of the state of nutrition could be better controlled. One group of these bugs hatched about from eight to nine days before the others. All were fed, however, at the same time and were reared under the same ecologic conditions of temperature and humidity. This has been done under conditions of relative humidity of 75 % and at two temperatures 27°C. and 32°C. At the end of 82 and 56 hours respectively, all the larvae molted. The older larvae molted exactly at the same time as the younger.

This pre-feeding period, in which no growth takes place, was not included in the time measurement of the instar because the internal physiologic conditions could thereby be better controlled and the external ecologic influences better studied. Although this period does not present the actual length of the instar, for the purpose of this study, it was preferable since only the comparative length of development under the various conditions was desired. In the following table, therefore, the term « length of an instar » does not indicate the period from molt to molt but from feeding to molt.

Results.

The length of the development of individual instars under the respective

conditions of humidity and temperature as obtained by the writer are given in the following table :

Time of Development

of Individual Instars of Bed Bugs under various Ecologic Conditions

Ecologic Condition		Number of Bugs	Length of Instars					Total in Hours	Total in Days
Temperature	Relative Humidity		I	II	III	IV	V		
32° C.	Below 10%	10	53	53	53	61	87	307	
	28-32%	6	56	59	67	64	92	338	
	50-60%	10	62	62	56	62	91	333	
	70-80%	8	56	56	66	58	86	322	
	80-90%	5	54	63	58	62	91	328	
	Above 90%	18	52	62	61	63	88	326	
	Average		55.5	59	60	61.5	89	326	13.5
27° C.	Below 10%	10	57	68	70	84	128	407	
	28-32%	6	74	77	80	80	128	439	
	50-60%	10	62	68	72	80	118	400	
	70-80%	8	72	80	77	80	116	425	
	80-90%	5	67	67	72	82	120	408	
	Above 90%	16	68	72	76	79	116	411	
	Average		66.5	72	74.5	81	121	414	17.2
22° C.	Below 10%	10	159	152	156	180	215	862	
	28-32%	8	165	168	152	155	249	889	
	50-60%	7	152	158	167	150	237	863	
	70-80%	5	134	179	145	154	230	842	
	80-90%	5	150	144	167	150	239	850	
	Above 90%	12	142	135	171	145	229	822	
	Average		150	156	160	156	233	855	35.6

A glance at this table indicates that the first instar is the shortest while the last is the longest. The other instars differ slightly from each other — that is, they show an increase in length as the bug becomes older. Previous students maintain that the first instar is longer than any of the others with the exception of the last, which is the longest. This seeming contradiction may be due, perhaps, to the fact that the pre-feeding periods, which were not included in the present figures, are not equal in length. As one would expect, the pre-feeding period of the first instar is longer than any of the others because the insect is very soft after it hatches from the egg.

The table also shows that the relative humidity of the air had very little influence upon the rate of development of the individuals. In a few instances, at a temperature of 32° C, it seems that a low relative humidity shortened the period of development. On the other hand, at a temperature of 22° C, the shortest period of development was under high relative humidity. However, the differences in either case are not very marked and constant so that one would be inclined to believe that in bed bugs also, as in hemiptera feeding on plant juice, the development is not influenced by atmospheric relative humidity. Naturally, the reason for this is the quality of food which contains much water. As the food supply diminishes, the influence of the humidity becomes more noticeable. Preliminary experiments with starving adult bugs showed that, as with the first instar larvae, the higher the temperature and the lower the percentage of relative humidity, the quicker they died.

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Séance du 16 Février 1932

Présidence de S.E. le Dr. MOHAMED SHAHINE Pacha, Président.

Communications

Contributions towards a knowledge of the Thysanoptera of Egypt, VI.

(with Plate I and Fig. 1-6)

by H. Priesner

15. An unexpected member of the genus Stictothrips in Egypt :

Stictothrips leopardinus, sp. nov.

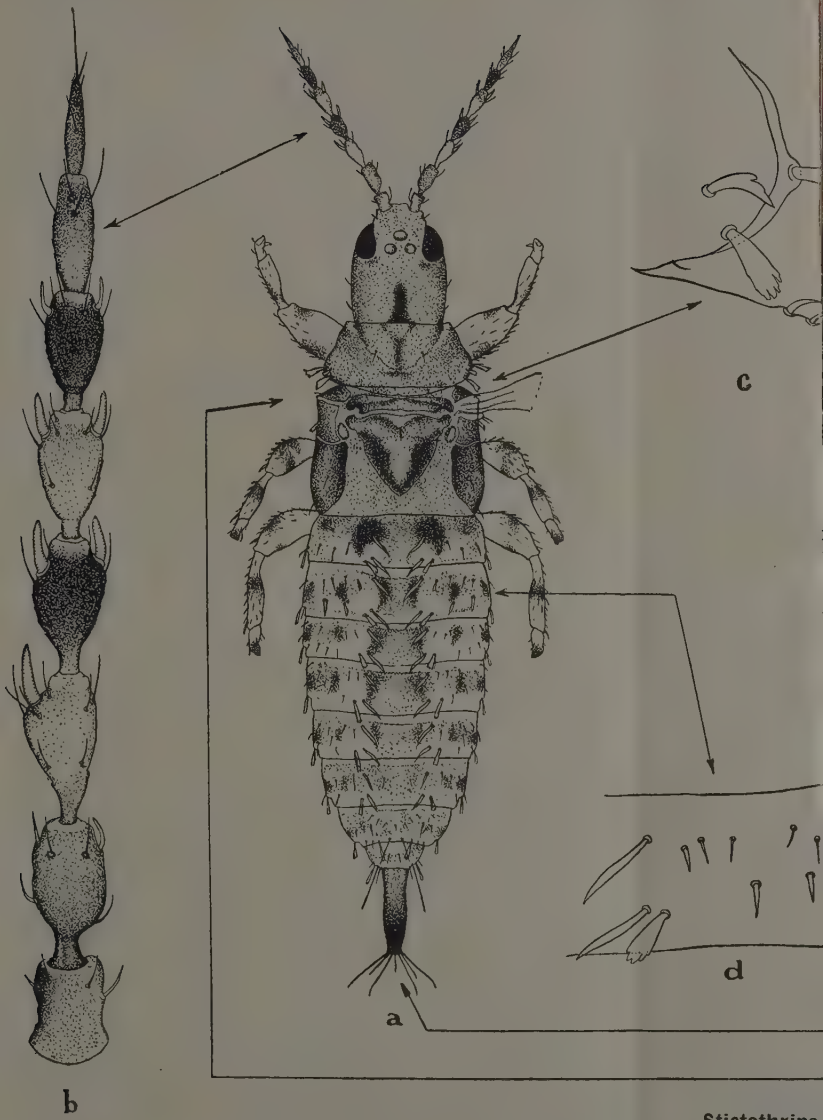
(Plate I)

Female : Very markedly coloured. Straw-yellow with greyish shadings and markings. Head and pterothorax distinctly shaded with grey, prothorax paler, abdomen lightest. Blackish-brown are : two crescent-like spots close behind the eyes near their inner margin, a broad longitudinal streak in the middle line of the vertex just in front of the hind margin, occupying the two last fifths of the length of the head, the fine hind marginal thickening, a short stripe laterally in front of the eyes (head projection), and some indistinct markings on the pronotum ; a horse-shoe-like spot occupying the margin of the metascutum, two lateral cross-spots on the mesonotum, and the sides of the metathorax ; on the abdomen the 2nd segment is the darkest because it is provided with two large horse-shoe-like spots which are opened behind ; these markings are on the following segments split up into six spots which become very faint on segment 8, and are entirely wanting on the following segment ; tube dark, distinctly cleared up towards base (except at the dark sides) ; segments 1 and 2 of the antennae strongly shaded, but segment 1 paler inside, 3 yellowish with a faint darker spot at the outer margin near the tip, 4 wholly dark brown, except the stalk, 5 yellowish, except the terminal third, 6 and 8

dark, as 4, 7 light in basal half; legs pale yellow with dark markings : Femora at the outer and inner margin in the middle with irregular spots, tibiae with a ring near (before) the middle, which is paler in the fore tibiae and strongly split up; wings pale greyish, fore wings with distinct net-like structure in the distal half.

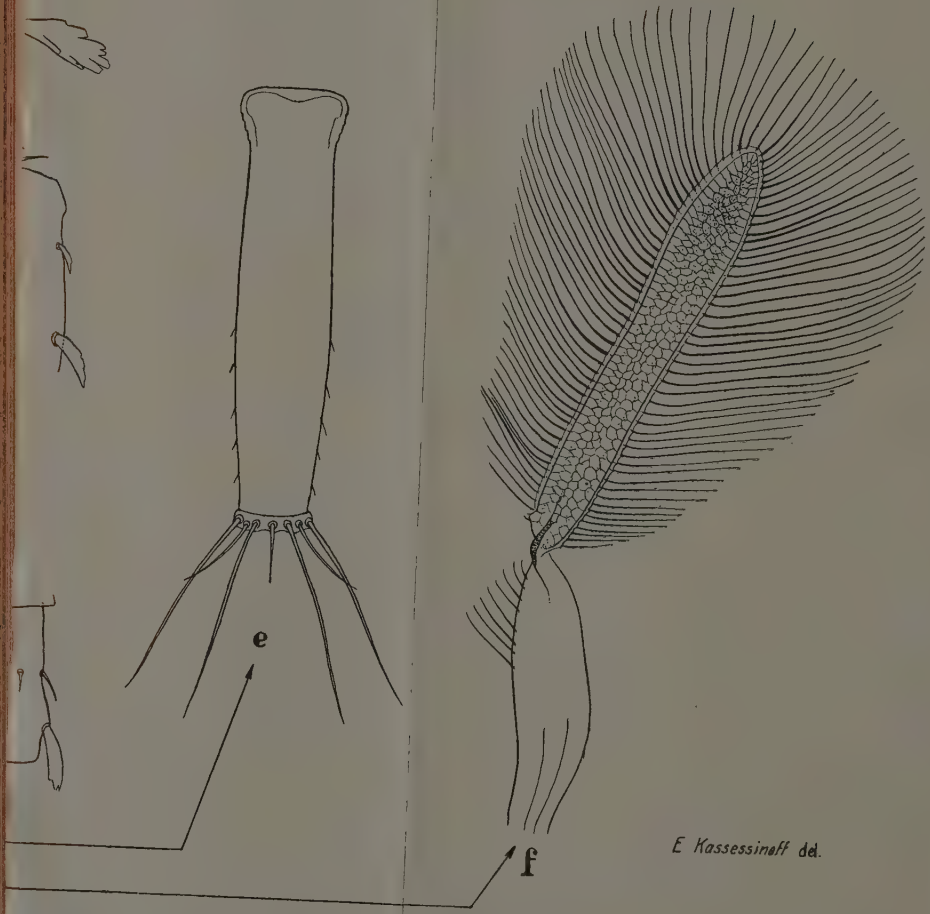
Head length with process 240, from fore margin of eyes about 208 μ, width across middle of cheeks 202 μ; cheeks somewhat rugose, eyes not protruding, length 78 μ dorsally, 74 μ laterally; postocular bristles not visible, in any case very small, laterally not at all protruding; ocellar triangle almost equilateral, situated in the middle of the eyes; head above, in front of the first ocellus and close behind the eyes with a small pit on either side, the last ones with net-like structure; mouth-cone reaching the hind margin of the prosternum, strongly narrowed but including labrum blunt at tip; antennae length 450-467 μ, segment 1 narrow, 2 longish, 3 asymmetrical, considerably arched at outer margin, the following segments normal, 8 longish, spindle-shaped; areola of segment 2 situated about in the middle of it: segment 3 with one thick sense-cone, segments 4 and 5 each with two of them, sense-cones on joint 6 much smaller and slenderer, segment 7 with 1 thin dorsal cone; measurements of joints : 42(31), 48-50(32), 67(34), 62(34), 64(29), 57(22-24), 53(17), 50(11) μ. Prothorax strongly transverse, length about 126, width including coxae 330 μ; bristles small, fan-shaped, hyaline, those at fore angles developed, the hind-angle bristles and the coxals have a length of 25-28 μ. Mesothorax width 273 μ, metathorax 400 μ; surface of pterothorax, particularly the triangular metanotal plate rugose, the process, leading in the median line towards the hind margin, net-like longitudinally; wings of the same shape as in *St. faurei* Hood, narrow, in the middle not only narrowed but broken (Plate I, fig. f.), the distal half with tiny net-like structure. Fore tarsi with distinct, sharp tooth. Abdomen flat like the whole body, bristles short, colourless, enlarged distally and somewhat fringed, tergites with net-like surface, the middle line deepened longitudinally towards terminal segments; length of bristles on segment 8 about 42 μ, of b. 1 of segment 9 about 28 μ, shape the same, b. 2 somewhat longer, 34 μ, b. 3 hair-like, pointed, length about 78-81 μ. Shape of tube as in fig. e, long, length about 190 μ, width across base 50-52 μ, at tip 31 μ; terminals short, laterals of them 87-90 μ.—Total body length (normally distended) : 1.73 mm.

Habitat : This species is a rare one, I found only a few specimens in November 1931, between the leaf-sheaths of *Phragmites communis* L.; the species is because of its flat body adapted to the life on grasses, its movements are very slow. It is not likely a predaceous insect, I never saw it associated with mealy-bugs as *Podothrips aegyptiacus* which lives on the same plant, and on other grasses too.



Stictothrips

a. Total view. — b. Antenna. — c. Angles of pro- and meso



eopardinus sp. nov.

horax. — d. Third abdominal segment. — e. Tube. — f. Fore wing.

Locality : Magadla, Abu Roash (Giza Province). — Type in coll. Min. Agric., Cairo.

This species is very closely allied to *Stictothrips faurei* Hood from South Africa but is not identical with it; they are distinguished from each other by the shape of the head and the eyes, and by the measurements of the antennae. In *St. faurei*, the head is much more strongly arched at cheeks, and strongly constricted at base; the eyes are much larger (dorsal length 104, lateral length 87 μ; head length 250 μ, width 225 μ), the dark ring-like spots on the tibiae are broader and more distinctly marked; the antennae are longer, particularly segment 3, which is 2.8 times as long as wide, and 1.2 times as long as 4; while in *St. leopardinus*, the same segment is only twice as long as wide, and 1.1 as long as segment 4; furthermore, it is not arched on outer margin as it is the case in *leopardinus*.

16. Euryaplothrips crassus, Ramakrishna, recorded from India, occurs in Egypt.

(Fig. 1-6)

This species is described by Ramakrishna Ayyar & Marga-

Fig. 1. — *Euryaplothrips crassus* Ram. & Marg.

bandhu in Journ. Bombay Nat. Hist. Soc., XXXIV, 4, March 1931, p. 1037-1038, fig. 1. The description may be completed by exact figures due to Mr. Kassessinoff.

The description of the larvae may be added.

Euryaplothrips crassus, Ram. & Marg.

Larva, second stage.

Yellowish, some reddish pigment cells in the last three abdominal segments, traces of such cells also in the head. Dark grey shaded are : the antennae (segment 3 somewhat lighter), the legs, head-plates (with small central one), pronotal plates, two complete plates on segment 8 of the abdomen and the whole of segments 9 to 11.

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Fig. 2. — *Euryaplothrips crassus* Ram. & Marg.: Antenna of the female.
Fig. 3. — *Euryaplothrips crassus* Ram. & Marg.: Fore leg of the female.

Body very compact, antennae short. All bristles colourless, without bristle-plates. Head length up to the hind margin only 90 μ, widened posteriorly, width across eyes 80 μ; bristles on head small, pointed; antennae

length 164-170 μ ; segments, 14(29), 27-28(22), 28(22), 31(22), 27(20), 21(14), 17(8) μ ; joint 8 short, 3 only 1.2 to 1.3 times as long as wide ; sense cone on segment 4 short, 8 μ, thick. Bristle 1 to 3 of the pronotum small, pointed, b.4 only about 11 μ, situated outside the pronotal plate which is obliquely truncate at inner basal margin, b.6 about 45 μ, not quite sharp or

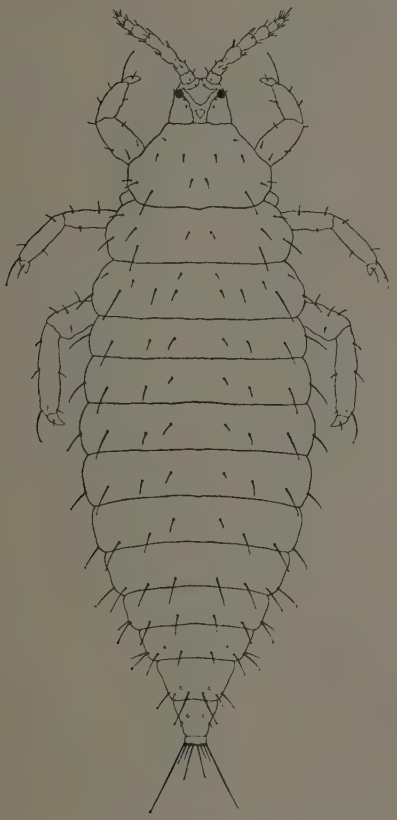

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Fig. 4

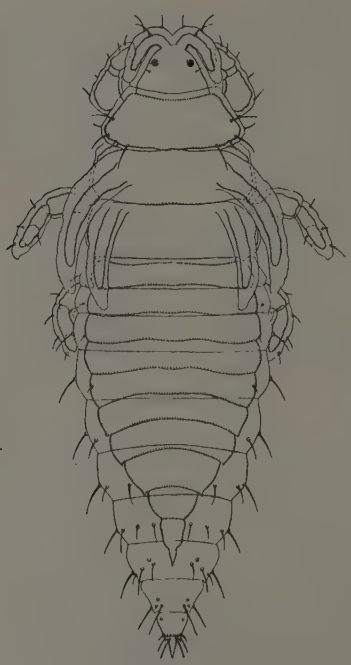
Euryaplothrips crassus Ram. & Marg.

Larva first stage

opened, b.7 small, not more than 17 μ. B.6 of mesonotum as b.6 of pronotum. Dorsal bristles of the abdomen not quite sharp, b.2 of segment 9 like b.1 and 3 not quite pointed, length 30 μ, B. 3 : 34-36 μ, b.1 longer ; length of segment 9 dorsally only 60 μ, but its width at base 126, at tip 84-90 μ ; segment 10 strongly tapering towards apex with somewhat concave sides, length 62, width across base 67, across tip 22 μ. Terminals comparatively very moderately long, 105 μ. — The full grown larva measures 1.2 mm. in length, its width across segments 3 or 4 of abdomen being 450 μ.

Larva, first stage.

As the former but somewhat paler, in the abdomen reddish pigment cells hardly recognizeable; the grey shadings as in the former stage but antennae paler, only segments 2 and 8 dark greyish, the remaining segments more or less pale greyish, 3 lightest but not strikingly lighter than the others; segment 8 of the abdomen not shaded, segment 9 with the normal dark apical ring.



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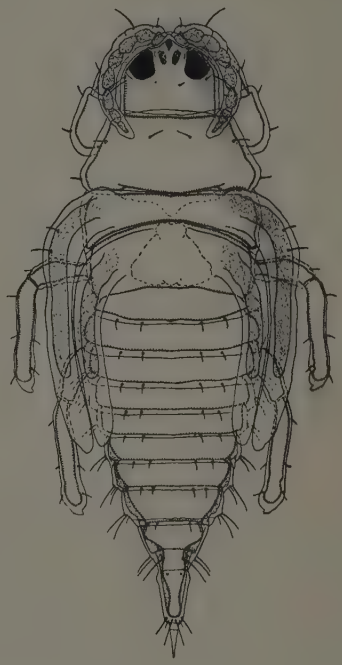

6

Fig. 5. — *Euryaplothrips crassus* Ram. & Marg.: Pupa 1st stage.
Fig. 6. — *Euryaplothrips crassus* Ram. & Marg.: Pupa 2nd stage.

Head width across eyes about 62 μ; bristles very small; antennae length 129-132 μ; measurements of segments, 11(22), 18-20(20), 20(22), 21(23), 20-21(21), 17(16), 17(8) μ; segment 2 with dark ring distally, 8 short conical; sense-cone on segment 4 (inside) only 8-10 μ. Bristles on prothorax very short, also the hind angle bristles do not exceed a length of 17 μ. The longest bristle on metathorax (b.3) 28 μ. Bristles on the abdomen only moderately long, tiny, b.3 of segment 8 not quite sharp, its length 31 μ, b. 1 of segment

9 thin, provided with a tiny knob, length 70 μ, b.2 still rounded at tip, 45-48 μ. Segment 9, width across apex 62, segment 10, length 42, width 42 μ, at apex 20 μ; it is arched from base (laterally), strongly narrowed towards tip but parallel before the extreme apex thus concave, seen from above.

Pupae.

Pupa 1st and 2nd stage are also present in the material collected by me; they are very compactly built; the figures 5 and 6 illustrate them much better than any description might do.

Habitat : I discovered this very remarkable type of the *Phloeothripidae* in numerous specimens with larvae and a few pupae, at Kom Ombo, 4.3.1931, in the inflorescences of *Aerva tomentosa*. The species is known from India where it has been found by Ramakrishna Ayyar in the « ears » of *Amaranthus*, and was sent to me some time ago for examination. It may be interesting to mention here that the host-plant of *Eurya-plothrips crassus*, *Aerva tomentosa*, occurs in the Western parts of India, and it is to be expected that the thrips in question has a similar distribution as the plant, and may thus be found in the intermediate territories.

Some remarks on the Orthoptera of the Sinai-Peninsule

by F. S. Bodenheimer (Jerusalem).

It was the intention of the writer after his trip in 1927 to revisit the Sinai-desert and to continue his explorations. As these hopes will probably not be realized the following checklist of the Orthoptera, hitherto known from this area may be of interest.

It includes a total of 84 species, which are distributed on the different families and the major zoogeographic components as follows :

Families	Number of Species	Component			
		Eremic	Mediterranean	Cosmopolitic	Paleotropic
Blattidae	7	5	—	2	—
Mantidae	15	12	2	—	1
Acrididae	45	32	7	—	6
Tettigoniidae	6	5	1	—	—
Grillidae	8	3	3	—	2
Dermaptera	2	1	—	1	—
Total	83	58	13	3	9
Orthoptera of Sinai in %	99,9	70,2	15,5	3,5	10,7
Coccidae of Sinai in %	100,1	74,2	20,4	—	5,5

The predominance of the eremic element is obvious. The larger genera of this group are *Eremiaphila* (7 species), *Heterogamodes* (3 species), *Sphingonotus* (9 species), *Lezina* (2 species), etc.

Between the 13 mediterranean species some (*Tridactylus variegatus*, *Tylopsis liliifolia*, *Anacridium aegyptium*) are restricted only to the hygrophilous vegetation, others (*Iris oratoria*, *Orchamus zebratus*, *Thmetis cisti*, *Tropidopola longicornis*) have been found till now only on the mediterranean shore. The remaining species are known to be very tolerant against arid conditions (*Rivetina baetica*, *Duroniella lucasi*, *Acrotylus insubricus*, *Pyrgomorpha conica*).

The 9 paleotropic species are *Mantis religiosa*, *Gryllus domesticus*, *Liogryllus bimaculatus*, *Acridella nasuta*, *Aiolopus* 2 ssp., *Poecilocerus bufonius*, *Schistocerca gregaria* and *Paratettix meridionalis*.

The 3 cosmopolitic forms (*Periplaneta americana*, *Phyllodromia germanica*, *Anisolabis maritimus*) are without any bearing towards the character of the Sinai-fauna.

It is of interest, how close the distribution of the Orthoptera on the different zoogeographical groups follows those of the Coccidae of the Sinai. This agreement is of importance, as it enables us to have more confidence to our analysis. This is rather desirable, as the 84 recorded species represent probably only one half or perhaps less of the total number of species present.

We may conclude from another analysis, that our representation of the character of the Sinai-Orthoptera is really significant. We compare the distribution of the families of this group in the adjacent regions of similar character.

Area	Number of species	Dermaptera	Blattidae	Mantidae	Phasmidae	Acrididae	Tettigoniidae	Gryllidae	Author
	%	%	%	%	%	%	%	%	
Sinai	84	2,4	8,3	17,9	—	53,6	8,3	9,5	Bodenheimer
Egypt	113	2,7	13,3	23,9	0,9	38,1	7,2	14,1	Werner
Tripolis	71	4,2	9,9	16,9	2,8	49,3	5,6	10,6	Werner
Eremic regions Total		3,1	10,5	*19,6*	1,2	47,0	*7,0*	11,4	
Mediterranean regions Total (France, Asia Minor)		5,1	6,9	4,8	0,9	39,6	35,6	7,2	Chopard, Werner

The agreement between the three related eremic areas as compared with typically mediterraneans areas is again obvious. The large Mantid-component as well as the very small Tettigoniid-component are its main characters.

The interesting question of the affinity and local distribution of the eremic forms will be treated in another paper. The known endemic species are even not recorded here as such, because it is pretty sure, that their large majority will be found one day or another in other parts of the eremic subregion.

Blattidae (1)

1. *Polyphaga aegyptiaca* (L.).—Er.
   1 ♀, Sinai (Brit.Mus.).

(1) Roman numbers=months of capture; abbreviated name of collector or museum; Er.=Eremic, Med.=Mediterranean, Cosm.=Cosmopolitic, Pal.=Paleotropic.

2. *Heterogamodes africana* L.—Er.
   1 ♀, Der el Belah (Brit.Mus.).
3. *Heterogamodes ursina* (Burm.).—Er.
   El Arish, 2 ♀ ; Der el Belah, 4 ♂, 2 ♀ (Brit.Mus.) ; Mohammedia X/XI, Mazar XI/I (Boyd) ; Magdaba (Alfieri).
   (*H. maris mortui* Jans. is not known from Sinai. Chopard is in error if he states, that the type is from the Sinai, as it is expressely recorded as originating from the Ghor es Safije (Dead Sea)).
4. *H. cerverae* (Bol.).—Er.
   El Arish, 1 ♀ ; Mohammedia, 1 ♂ (Brit.Mus.).
5. *Periplaneta americana* L.—Cosm.
   El Kubri VI (Boyd) ; Tor VII (Bo./The) ; El Arish II (Bo.).
6. *Shelfordella tartara* (Sauss.).—Er.
   Wadi Feiran VII, 2 ♂, 1 ♀, 3 larvae (Bo./The).
7. *Phyllodromia germanica* L.—Cosm.
   Mohammedia X (Boyd) ; El Arish II (Bo.).

Mantidae.

8. *Eremiaphila audouini* Lef.—Er.
   Desert near Suez (Bove) ; Wadi Chashibi IV, larva, ♀ ; W. ab Orte IV, larva ; W. Samrah IV, 2 ♀ (Kneucker).
9. *E. bovei* Lef.—Er.
   Desert near Suez (Bove) ; Abu Slima VII, 2 ♀ (Bo./The) ; Ballah VII (Boyd).
10. *E. cerisyi* Lef.—Er.
    ♀, Sinai (Coll. Brunner Nr. 20.919 ; coll. Steindachner).
11. *E. dawydowi* Wern.—Er.
    ♀, Sinai (Coll. Brunner Nr. 20.920 ; coll. Steindachner).
12. *E. khamzin* Lef.—Er.
    Desert near Suez (Bove) ; Ain Musa III, ♂, ♀ (Kneucker) ; Romani VIII (Boyd).
13. *E. rufipennis* Uv.—Er.
    Wadi Tarfa VII, 1 ♀ (Bo./The).
14. *E. zetterstedti* Lef.—Er.
    Desert near Suez (Bove).
15. *Heteronytarsus aegyptiacus* Lef.—Er.
    Romani VIII (Boyd).
16. *Mantis religiosa* L.—Pal.
    Romani IX (Boyd).
17. *Sphodromantis viridis* (Burm.).—Er.
    El Tor, Ballah VII, El Arish IV (Boyd) ; Dj. Hanan IV, on *Tamarix*, 3 ♀, 1 larva ; W. Chashabi IV, 1 larva (Kneucker). — In all *Tamarix*

woods, on *Haloxylon* bushes, etc., in the wadis rather common VII (Bo./The).

18. *Iris oratoria* L.—Med.
Mohammedia IX, Mazar XII, Romani I, El Arish I (Boyd).
19. *Rivetina baetica* (Ramb.).—Med.
W. Chashibi IV, W. Mosagawet (larva), desert Kaa V (larva) (Kneucker); Der Arbain VII, large larvae (Bo./The).
20. *Eremoplana infelix* Uv.—Er.
1 ex. in Brit. Mus. labelled « Spain » probably from Sinai (Uvarov). W. Nasib VII, 1 large larva in a vegetable garden (Bo./The).
21. *Blepharopsis mendica nuda* G.T.—Er.
El Tor : Dj. Hamam IV (1 ♂), W. Gergir IV (2 ♀) (Kneucker); Romani IX; Mazar I, IV; El Arish I (Boyd).—In all *Tamarix* woods, on *Haloxylon* bushes, etc., in the wadis, rather common VII (Bo./The).
22. *Sinaella nebulosa* Uv.—Er.
Mohammedia X, 1 ♂ (Boyd).

Tettigoniidae.

23. *Phaneroptera albida* Wlk. (= *P. minima* Br.).—Er.
Wadi es Schech IV.02, larva (Kneucker).
24. *Tylopsis liliifolia* F.—Med.
W. Feiran VII, 1 ♀ (Bo./The).
25. *Conocephalus* sp.—Er.
W. Feiran, 1 ♀ (Bo./The).
26. *Homorocoryphus nitidulus* Scop.—Er.
Suez, 1 ♀, VII. 27 (Bo./The).
27. *Lezina concolor* Walk.—Er.
Ballah VII.16; Mazar XI/XII.16; I.17 El Arish (Boyd, Nr. 1754). — Nocturnal insects living on the coastal dunes.
28. *L. abominata* Br. (= *Magrettia* a.Br.).—Er.
Uvarov believes that this species may be a synonym to the former species. Because of its other habitat I prefer to regard it as a different species till the revision of the genus will settle this question.
W.es Schech IV.02, larva (Kneucker).

Gryllidae.

29. *Oecanthus turanicus* Uv.—Er.
Wadi Feiran VII, at light (Bo./The).
30. *Pteronemobius gracilis* (B.Jak.).—Er.
Oasis Feiran VII, at light (Bo./The).
31. *Gryllomorpha gestroana* Bol. (= *Gryllodes ? niloticus* (Sauss.) (Boyd)).—Er.

Romani XII/I, 1 ♂, 2 ♀ (Boyd).

32. *Gryllus domesticus* L.—Pal.
Ballah VII (Boyd).
33. *Gryllus burdigalensis* Latr.—Med.
Romani IX (Boyd).
34. *Liogryllus bimaculatus* (De Geer).—Pal.
Ain Musa III, 1 ♀ (Kneucker) ; Monastery St. Catherine VII (2♂,1♀), desert Kaa VII (1 ♀) (Bo./The) ; Ballah VII, Mohammedia X, Mazar XI (Boyd) ; El Arish II (Bo.).
35. *Tridactylus variegatus* Latr.—Med.
Oasis Feiran VII, near running water, not uncommon (Bo./The).
36. *Gryllotalpa gryllotalpa* L.—Pal.
El Arish II (Bo.).

Acrididae.

37. *Acridella nasuta* L. (=*A. unguiculata*).—Pal.
Ain Musa III, 1 ♂ (Kneucker) ; W. Genneh (Lord) ; Djebel Watiyeh (Hart) ; Mazar XI (Boyd).
38. *A. longicornis* Krauss.—Er.
W. Tarfa III, Djebel Musa IV (Kneucker).
39. *Platypterna* sp. (=*P. tibialis* Krauss).—Er.
W. Gergir IV, 1 ♂ (Kneucker) ; W. Feiran, Abu Slima VII (1♂,1♀) (Bo./The.) ; Mazar IV (Boyd).
The species is at present not yet described, but surely not identical with *P. tibialis* from Greece (Uvarov) (perhaps *P. ladakiae* Salfi).
40. *Calephorus compressicornis* Latr.—Med.
Suez VII, 1 ♂ (Bo./The).
41. *Duroniella lucasi* Bol.—Med.
Tor : Djebel Hamam IV, 2 ♀ (Kneucker) ; Suez VII, 1 ♀ (Bo./The).
42. *Aiolopus thalassinus* (F.).—Pal.
Ballah VII (Boyd) ; Suez VII (3♂,4♀), W. Feiran VII (2♀) (Bo./The).
43. *A. strepens* (Latr.).—Pal.
Suez VII, 1 ♀ (Bo./The).
(*Oedipoda coerulans* Roes)
Sinai (Hart).—A confirmation seems necessary.
44. *Thalpomena hirtipes nigriceps* Uv.—Er.
Monastery St. Catherine VII, 1 ♂ (Bo./The).
45. *Sphingonotus balteatus latifasciatus* (Walk.).—Er.
Mt. Sinai ; Rafa (Lord).
46. *S. mecheriae* Krauss.—Er.
W. Timam IV, 1 ♀ (Kneucker) ; Kantara VIII (Boyd).
47. *S. niloticus* Sauss.—Er.

Desert Kaa IV (1 ♀), W. Chashabi IV (1 ♀, large larva), W. Samrah IV, etc. (Kneucker).

48. *S. obscuratus* (Walk.)—Er.
W. Isle VII, 3 ♀ (Bo./The).

49. *S. pictus* Wern.—Er.
W. Isle, Monastery St. Catherine, Abu Slima (Suez) VII (1 ♀), W. Feiran VII (5♂,1♀) (Bo./The).

50. *S. rubescens* (Walk.).—Er.
Monastery St. Catherine VII (2♂,2♀), W. Nasib VII (1♂) (Bo./The).

51. *S. Savignii* Sauss.—Er.
W. Samrah IV (5♂,4♀), W. ab oret V (1 ♀), Tor V (large larvae) (Kneucker).

52. *S. theodori* Uv. (= *coerulans* L.).—Er.
W. Genneh (Lord) ; W. Budr IV (1 ♂), W. Sahera IV (1 ♀), W. ab Orte IV (1 ♀). Central Mountains IV (1 ♂) (Kneucker) ; W. Nasib VII (2 ♂), Monastery St. Catherine VII (1 ♂, 1 ♀) (Bo./The).

53. *S. tricinctus* Walk.—Er.
W. Genneh, W. Feiran (Lord) ; Rafa IX (James).

54. *Helioscirtus gravesi* Uv.—Er.
Suez : Abu Slima VII, 1 ♂, 3 ♀ (Bo./The).

55. *H. tichomirovi* Stechelk.—Er.
W. Nasib VII, 1 ♂ (Bo./The).

56. *Hyalorrhipis hyalinus* Uv.—Er.
W. Feiran ; Abu Slime VII, 2 ♂, 3 ♀ (Bo./The).

57. *H. canescens* Sauss.—Er.
W. ab Orta/W. Samrah IV, 1 ♂ (Kneucker).

58. *Leptopternis gracilis* (Ev.).—Er.
Kantara (Boyd).

59. *Thmetis cisti* L.—Med.
Mazar III (Boyd).

60. *T. carinatus* F.—Er.
Mt. Sinai (Lord), cf Uvarov 1924, p. 33.

61. *Leptoscirtus aviculus* Sauss.—Er.
W. Nasib VII (1♂, 1♀), W. Tarfa VII (1 ♀), Monastery St. Catherine VII, 1 ♂ (Bo./The).

62. *L. niloticus* Sauss.—Er.
Abu Slima VII (1 ♀), Desert Kaa, 2 ♂, 1 ♀ (Bo./The).

63. *Acrotylus insubricus* Scop.—Med.
Ain Musa III (1♂, 2 larvae), Oasis Feiran III, 1♂, 4♀ (Kneucker) ; Suez VII (3♀), W. Feiran VII (1♂, 2♀), Monastery St. Catherine VII (3♂, 1♀), W. Nasib 1♂ (Bo./The).

64. *Quirogesia miniata blanchardiana* Sauss.—Er.

W. Mosagawet IV (♀ larva), W. ab Orte/W. Samrah IV, ♀ larva (Kneucker).

65. *Pamphagulus bodenheimeri* Uv.—Er.
Near Abu Slima on sand dunes VII, 1 ♀ (Bo./The). — The smallest known Pamphagid.

66. *Orchamus zebratus* Br. W.—Med.
Mohammedia X, Romani XI, I, Mazar XII/I, El Arish I (Boyd).

67. *Poecilocerus bufonius* (Klug).—Pal.
Very common on Asclepiadaceae over the whole peninsula. Kneucker met it in April in enormous numbers. In July they were only scattered individuals. Only in the northern part it has not yet been discovered. W. Isle VII (1 ♂), W. Feiran, 1 ♀ (Bo./The) ; W. Barrah (Hart) ; W. Karam Alfieri), etc.
(*P. vignaudii* Gur.).
W. Amara and W. Genneh (Lord).—This determination of Walker should not be accepted, before it is confirmed.The species is known from Abessynia.

68. *Pyrgomorpha conica* Ol. (= *P. grylloides* Krauss).—Med.
Mt. Sinai (Lord) ; Central Mountains IV, 1 ♂, 1 ♀ (Kneucker) ; Romani IX, Mazar XI/XII (Boyd).

69. *P. cognata* Krauss.—Er.
Suez VII (1 ♀), Monastery St. Catherine VII, 2 ♂ (Bo./The) ; Ain Musa III (1 large larva), W. Mosagawet IV (1♀), W. ab Orte/W. Samrah IV 2 ♂, 2 ♀, 2 larvae (Kneucker).

70. *Tenuitarsus angustus* (Blanch.).—Er.
Romani IX, XI, Mohammedia X/XI, Mazar XI (Boyd).

71. *Chrotogonus lugubris* (Blanch).—Er.
Suez VII, 1 ♂, 1 ♀ (Bo./The).

72. *Dericorys millieri* Fin.—Er.
Mohammedia X, Ballah VII (Boyd).

73. *Dericorys curvipes* Redt. (= *D. albidula*).—Er.
W. Feiran VII, 2 ♂, 2 ♀, may seem in copula (Bo./The) ; W. Feiran III, desert Kaa IV, young larvae (Kneucker) ; Ballah VII (Boyd).

74. *Sphodromerus serapis* (Serv.) (= *Caloptomus scriptipennis* Walk.)—Er.
Mt. Sinai (Lord) ; W. Tarfa/Central Mountains IV, 1 ♂, 1 ♀ (Kneucker).

75. *Anacridium aegyptium* L.—.Med.
W. Hebran III, 1 ♀ (Kneucker) ; Mt. Sinai, W. Feiran (Lord) ; Mohammedia X (Boyd).—Everywhere abudant in the vegetation near small water curves, and restricted to this type of vegetation VII (Bo./The).

76. *Schistocerca gregaria* Forsk.—Pal.
In some years (1904 Kneucker, 1928/30) very abundant and breeding

but the Sinai is probably not a permanent breeding area for this species.

77. *Tropidopola longicornis* Fied.—Med.
Suez ; El Arish/Mohammedia (Brit. Mus.).

78. *Thisoecetrus continuus* Walk. (= *Th. littoralis* Krauss).—Er.
W. Tarfa III (1♀), Ain Musa III (1♀), Tor/Djebel Hamam IV (3♂, 1♀), Wadi and Oasis Fairan III (2♂, 4♀), W. ab Orte and W. Samrah IV (Kneucker) ; Monastery St. Catherine VII, 3 ♂, 1 ♀ ; W. Feiran (Bo./The).

79. *Th. theodori* Uv.—Er.
W. Feiran VII, 1 ♂ (Bo./The).

80. *Cyclopternacris morbosa* (Serv.) (= *Caloptenus cinc̆ticollis* Walk.).—Er.
Djebel Musa (Lord) ; W. Isle VII, 1 ♂ (Bo./The) ; Djebel Serbel 2000 ma.s. III (1♀), W.ab Orte (1♀), W.Tarfa/Central Mountains IV, Djebel Catherin ca. 2100 m a.s. IV, 1 ♀ (Kneucker).

81. *Paratettix meridionalis* (Ramb.).—Pal.
W. Feiran VII, 2 ♂, 3 ♀ (Bo./The).

Dermaptera.

82. *Forficula barroisi* Bol.—Er.
Wadi Tarfa III, 1 ♀ (Kneucker).

83. *Anisolabis maritima* Gen. (= *Forficula lurida* (Frynch) (Kneucker).—Cosm.
Larva : exact locality not known (Kneucker).

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Assemblée Générale Ordinaire du 14 Mars 1932

L'Assemblée Générale Annuelle n'a pu avoir lieu à la réunion précédente par suite de manque de quorum.

Présidence de S.E. le Dr. MOHAMED SHAHINE Pacha, Président.

Rapport du Secrétaire Général :

Messieurs,

Le Rapport que votre Secrétaire Général a l'honneur de vous soumettre aujourd'hui vous signalera les progrès réalisés dans les différentes activités de la Société au cours de l'exercice qui vient de clore.

La situation financière sera séparément traitée dans le Rapport du Trésorier. Il y a cependant lieu de signaler ici que les dépenses courantes ont été de L.Eg. 24,351 inférieures à nos revenus malgré les crédits exceptionnels votés par votre Conseil et qui ont permis à la Société de participer à la XIV^{me} Exposition Agricole et Industrielle du Caire au cours de laquelle un nombre considérable de personnes ont visité notre stand et ont été à même d'apprécier le rôle utilitaire de la Société dans les domaines scientifique et pratique. A cette Exposition nous avons obtenu la médaille d'or du mérite et, lorsqu'elle eut fermé ses portes, en réponse à l'appel de S.E. le Ministre de l'Agriculture, votre Conseil a disposé en faveur du Musée Agricole Fouad I^{er} des divers objets qui avaient été exposés dans notre stand.

Notre Salle des Conférences a été mise à la disposition des congressistes de la Ligue des Apiculteurs d'Egypte, des congressistes de l'Institut de la Culture Scientifique, du corps enseignant de la Faculté des Sciences (Université Egyptienne). De nombreuses conférences y furent faites.

Une Exposition d'Apiculture s'est tenue dans notre siège.

Les demandes d'informations techniques, de la part des spécialistes ou du public, ont été plus nombreuses que par le passé. Grâce à notre organisation et aux matériaux d'études dont nous disposons, nous avons été à même de répondre à toutes les questions qui nous ont été soumises.

Des groupes d'élèves de trois grands établissements scolaires, accompagnés par leurs professeurs, ont été initiés à nos travaux. Des séances de vulgarisation scientifique furent organisées en leur faveur et nos laboratoires mis à leur disposition.

Parmi les visiteurs nous avons compté beaucoup de hautes personnalités et des savants de l'Etranger de passage en Egypte.

Notre Bibliothèque se développe progressivement. La cartothèque atteint 26.000 fiches à l'heure actuelle.

En fait de publications il a été distribué les Bulletins 1930 (4me fascicule) et 1931 (fascicules 1-4).

Le nombre des Membres de toutes catégories est en augmentation. Nous comptons actuellement 314 adhérents, dont 226 à l'Etranger et 88 en Egypte.

Les dons reçus, plus nombreux que par le passé, comprennent des insectes, des ouvrages pour la Bibliothèque, des oiseaux naturalisés. La donation la plus importante est celle de Monsieur Alfred Reinhart, d'Alexandrie. Elle est composée d'une grande armoire en chêne à 42 tiroirs contenant une très importante collection de Ténébrionides paléarctiques et d'un lot d'ouvrages.

Le Gouvernement de Sa Majesté a continué à nous témoigner sa bienveillance en approuvant la subvention annuelle de L.Eg. 500 qui nous a été accordée par le Ministère d'Agriculture.

Aux termes de l'article 13 des Statuts les membres sortants de votre Conseil cette année sont les suivants : MM. le Dr. Avocat Giovanni Ferrante, H. C. Efflatoun Bey, Dr. E. Ballard, A. Alfieri.

Ils sont rééligibles.

Vous aurez également à élire deux Censeurs.

Rapport du Trésorier :

Situation au 31 Décembre 1931

Doit	L.E.	M.	Avoir	L.E.	M.
Compte Bâtiment	13770	585	Compte Subvention du Gouvernement	500	000
» Portefeuille	14346	885	» Vente Publications	5	758
» Cie du Gaz	4	629	» Intérêts	225	295
» Collections	765	000	» Diplômes	1	200
» Frais Généraux	221	957	» Donations	40700	000
» Laboratoire	542	122	» Cotisations	59	983
» Bibliothèque	1279	753	» Divers	3693	708
» Publications	456	896	» Coupons	687	968
» Appointements	777	000			
» National Bank of Egypt	5842	521			
» Mobilier	7866	564			
	45873	912		45873	912

Inventaire

Actif			Passif		
Bâtiment	13770	585	Donations	40700	000
Portefeuille	14346	885	Divers	3718	059
Cie. du Gaz	4	629			
Collections	765	000			
Laboratoire	542	122			
Bibliothèque	1279	753			
Mobilier	7866	564			
National Bank of Egypt	5842	521			
	44418	059		44418	059

Le Portefeuille Titres en dépôt à la National Bank of Egypt se décompose comme suit :

133 Obligations Canal de Suez 5 %.
380 Actions Privilégiées Agricultural Bank of Egypt.
163 Obligations Héliopolis 5 %.
3700 £ Dette Unifiée Egyptienne 4 %.
4200 £ Dette Privilégiée Egyptienne 3 ½ %.

Signé : R. Wilkinson, Trésorier.

Rapport des Censeurs:

En conformité du mandat que vous avez bien voulu nous confier, nous avons l'honneur de porter à votre connaissance que nous avons procédé à la vérification du Bilan des comptes de la Société Royale Entomologique d'Egypte arrêtés au 31 Décembre 1931 qui vous est présenté par votre Conseil d'Administration, ainsi que les pièces y afférentes, dont nous avons reconnu la parfaite concordance avec les écritures de la Société et en indiquant clairement la situation.

Le Caire, le 27 Février 1932.

Signé : Dr. A. Azadian et E. Kaourk.

Décisions :

1° L'Assemblée Générale approuve les Rapports du Secrétaire Général et du Trésorier.

2° Elle vote une motion de remerciements à l'adresse des Membres du Conseil.

Elections :

Messieurs le Dr. Avocat Giovanni Ferrante, H. C. Efflatoun Bey et A. Alfieri, membres du Conseil sortants, sont réélus.

Monsieur le Dr. Kamel Mansour est élu en remplacement de Monsieur Edward Ballard.

Messieurs le Dr. A. Azadian et E. Kaourk sont réélus aux fonctions de Censeurs des Comptes de la Société.

Séance du 21 Mars 1932

Présidence de S.E. le Dr. Mohamed Shahine Pacha, *Président.*

Donations :

La Société a reçu :

1° De Monsieur Alfred Reinhart : Une armoire en chêne contenant 42 tiroirs destinés à contenir la collection de Ténébrionides paléarctiques précédemment offerte.

2° De Monsieur le Dr. J. Carmin : Un tiré à part de son travail : « *Growth and variability of wheat seedlings in magnesium sulphate solution* ».

3° De Monsieur W. J. Hall : Un tiré à part de son étude « *Observations on the Coccidae of Southern Rhodesia*, part IV. ».

4° De la Cairo Scientific Society : Une collection de *The Cairo Scientific Journal* (fasc. 18-19, 21-26, 29-102, 106-118).

Le Conseil remercie les généreux donateurs.

Nominations :

Le H.M. Stationery Office, de Londres, et Monsieur Alfred Reinhart, d'Alexandrie, sont nommés membres titulaires sur la proposition de Messieurs H. C. Efflatoun Bey et A. Alfieri.

Nécrologie :

Le Secrétaire Général fait part du décès de S.E. Moustapha Maher Pacha qui faisait partie de la Société depuis 1918.

Bureau du Conseil et Comité Scientifique pour 1932 :

Aux élections pour la constitution du Bureau du Conseil sont réélus :

Monsieur le Dr. Walter Innes Bey et Monsieur le Dr. Avocat Giovanni Ferrante, *Vice-Présidents ;* Monsieur Anastase Alfieri, *Secrétaire Général ;* Monsieur R. Wilkinson, *Trésorier.*

Sont élus membres du Comité Scientifique :

Messieurs le Dr. Prof. H. Priesner, Prof. H. C. Efflatoun Bey, Abdel Megid El Mistakawy et Kamel Mansour.

Communications

One new genus and species, and three new species of Trichogramminae from Egypt with remarks upon *Neocentrobia hirticornis*, *Alaptus minimus*, and *Trichogramma evanescens*.

by I. P. Kryger (Gentofte, Denmark).

Prof. Dr. H. Priesner of the Plant Protection Section (Ministry of Agriculture, Egypt) has been kind enough to send me some Egyptian Chalcid flies for determination. The small collection contained 7 species, one belonging to the Mymaridæ, and 6 to the Trichogramminæ. Three of the species were well known to the specialist while 4 of them were new to science, one of the latter moreover formed a genus, new to science.

In the present paper there are being described :

Sethosiella priesneri, n.g. & sp. ; *Abella dimorpha*, n. sp. ; *Neocentrobia similis*, n.sp. ; *Oligosita thoracica*, n.sp. ; *Neocentrobia hirticornis* Bl. & Kr. ; *Trichogramma evanescens* Hal. ; *Alaptus minimus* Walk.

TRICHOGRAMMINAE

Sethosiella n.g.

Antennae in both sexes 6-jointed consisting of scape, pedicellus, 1 annellus, 1 funicle joint, and 2-jointed clavus.

Head small, short, not as wide as thorax, eyes small, projecting, with few and large projecting facets. Eyes resembling a bit a fir-cone or the egg-cluster of *Adimonia tanaceti*. Ocelli placed in a nearly straight line. Mandibles bidentate.

Thorax short, wider than long, as wide as abdomen, mesothorax with distinct parapsidal furrows, scutellum oval. Thorax finely punctate.

Abdomen short and stout, as long as head and thorax together, sessile. Ovipositor short, not protruding. Phragma reaching far behind in the abdomen.

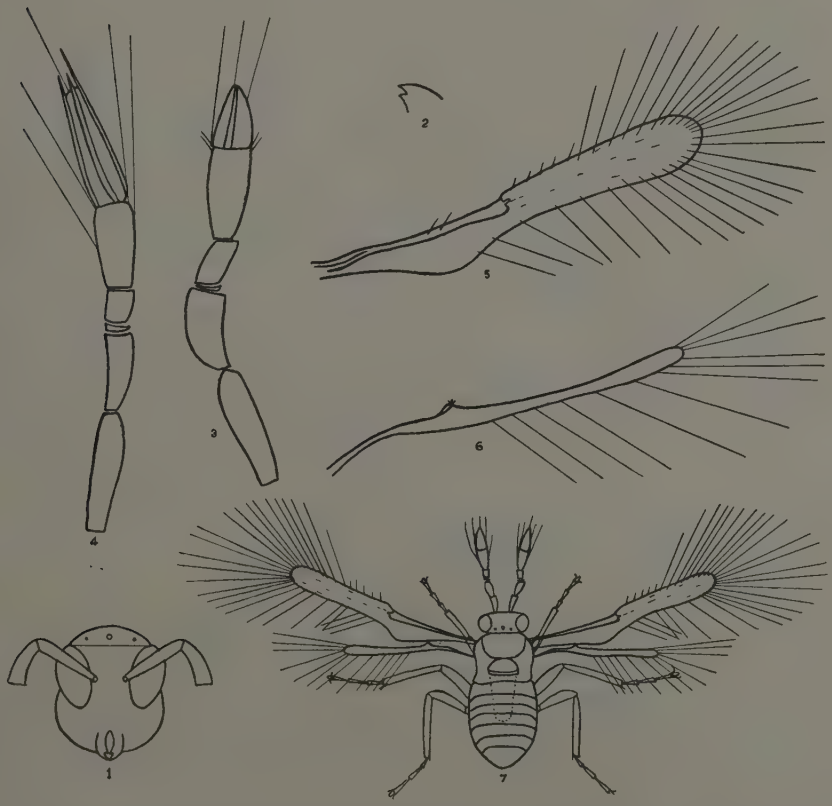
Legs long and slender. Wings resembling the wings of genera belonging to the Mymaridæ, and were it not for the true Trichogramminæ

antennae I should feel inclined to put the species to the Mymaridæ. Fore wing long and narrow, subcosta very short, marginal vein long, slightly wider towards tip, no radius, no stigma, and no postmarginal vein present. From stigma to apex the wing widening. Hind margin with a large convexity below middle of marginal vein. Marginal vein with two long setae. Marginal ciliae very long and stout, except the first five ones which are short; the longest ciliae nearly half as long as the entire length of the wing.

Hind wing linear with long and stout marginal ciliae on the hind margin.

The genus was named in honour of the Egyptian King Sethos I.

GENOTYPE : *Sethosiella priesneri* n.sp.



Sethosiella priesneri nov. gen. & sp.:
1. ♀ face seen from before. — 2. Mandible. — 3. ♂ antenna. — 4. ♀ antenna. — 5. Fore wing. — 6. Hind wing. — 7. ♂ adult.

Sethosiella priesneri n.sp.

FEMALE : Yellow, eyes and ocelli black. Antennae rather long, scape and pedicel long, funicle small, club nearly half as long as the whole antenna, club joints subequal in length, sparingly provided with long sense hairs, the apical joint in addition with four stout sense organs, overhanging the tip. Antennae fixed in the middle of the face.

MALE : Similar to the female, club of antennae with smaller sense-organs and to a very slight degree more slender than in the female.

MEASUREMENTS OF FEMALE : Length of antennae 0.4 mm., length of fore wings 0.55 mm., total body length 0.5 mm.

Named in honour of Prof. Dr. H. Priesner.

Many specimens, males and females, bred from vine leaves infested with *Retithrips syriacus* (Mayet), end of November 1930. The insect is probably a parasite of the eggs of *Retithrips*. We know now the hosts of most of the European Trichogramminae, and as *Sethosiella* is very different from all the other genera and we have never bred any Chalcid-flies from eggs of thrips it is very likely that *Sethosiella* and *Retithrips* are parasite and host, respectively. But as the tube containing the chalcidids also contained a few *Alaptus*, and this fly is well known to be a parasite of eggs of Psocids there may be other probabilities. Both, *Sethosiella* and *Alaptus* may be bred from *Retithrips* or both from *Psocus* (*Psocus*-eggs accidentally on the vine-leaves), or separately from *Retithrips* and *Psocus* or vice versa.

LOCALITY : Egypt (Tanta), November 1930.

TYPES : 3 females and 1 male on slides in Balsam (slides engraved : Type, *Sethosiella priesneri* Kryger, Tanta, Egypt, 30.11.30, vine-leaves with *Retithrips*). — Three slides made by H. Priesner, 1 by I. P. Kryger.

Type specimens in the collection of the Ministry of Agriculture, Cairo (Giza).

Abella Girault

Trans. Amer. Ent. Soc., vol. 37, p. 9; 1911.

Abella dimorpha n.sp.

FEMALE : Antennae short, scape somewhat longer than pedicel; annelli and funicle together half as long as pedicel; both, annelli and funicles exceedingly small; club rather stout, the three club joints subequal in size, two terminal ones with strong sense-organs but the whole antenna rather sparingly provided with sense-hairs.

Fore wing : Marginal vein long but shorter than the subcosta, radius very small, stigma nearly sessile. Surface sparingly covered with long hairs, 4 - 5 rows are visible, the remaining hairs are scattered; basal third to

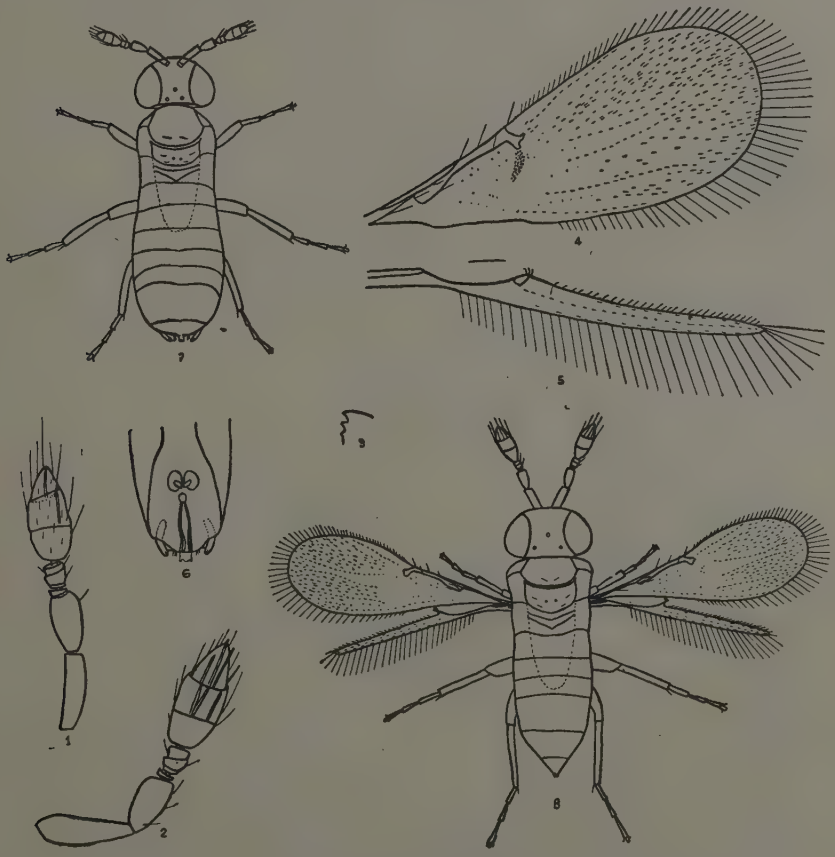
stigma with only a few hairs. Fringe long, longest ciliae 1/4 of the greatest width of the wing. A small infuscated spot beneath stigma.

Hind wings with three rows of discal ciliae, hind margin with long ciliae. Head and thorax dark brown. Metathorax shining white.

Abdomen yellow with a light brown shade at the margin of both sides. Antennae and legs yellow.

Male (apterous) : Antennae as in the female but the sense-organs not so numerous. Near tip of abdomen a pair of characteristical sausage-shaped appendages is to be seen, projecting from inside. Inside the abdomen are two bodies visible, resembling mushrooms.

Dark brown, metathorax shining white.



Abella dimorpha nov. sp.:

1. ♂ antenna. — 2. ♀ antenna. — 3. Mandible. — 4. ♀ fore wing. — 5. ♀ hind wing. — 6. ♂ tip of abdomen. — 7. ♂ adult. — 8. ♀ adult.

Measurements of female : Length of antenna 0.5 mm., length of fore wing 1 mm., total body length 1.4 mm.

Measurements of male : Length of antenna 0.5 mm., total body length 1.4 mm.

Numerous winged females and apterous males swept and bred from grasses, especially *Panicum colonum*.

Locality : Egypt (Pyramids Road, Giza), November 1931.

Types : 2 females and 2 males on four slides in Balsam (Slides engraved : *Abella dimorpha* Kryger, Nov. 1931, Pyramids Road, Giza, on grasses ; I. P. Kryger mounted).

Type specimens in the collection of the Ministry of Agriculture, Cairo (Giza).

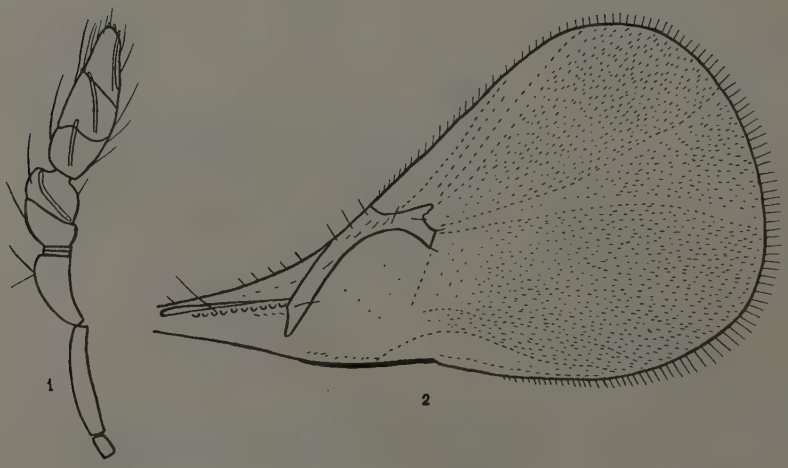
Neocentrobia similis n.sp.

Very near to *Neocentrobia hirticornis* Bl. & Kr. but differs in the venation of the wing, and in the surface-covering of it.

While in *hirticornis* the tip of the radius is beyond the middle of the wing, in *similis* it does not reach the middle. Radius in *hirticornis* long and slender, nearly twice the length of the radius in *similis*. Surface of wing more evenly covered with hairs than in *hirticornis* and not all surface-hairs arranged in rows. Eight rows are to be seen.

Ovipositor just reaching tip of abdomen.

Colouration as in *hirticornis* : dark brown.



Neocentrobia similis nov. sp.: 1. ♀ antenna. — 2. ♀ fore wing.

As to the differences between *hirticornis* and *similis*, see the figures.

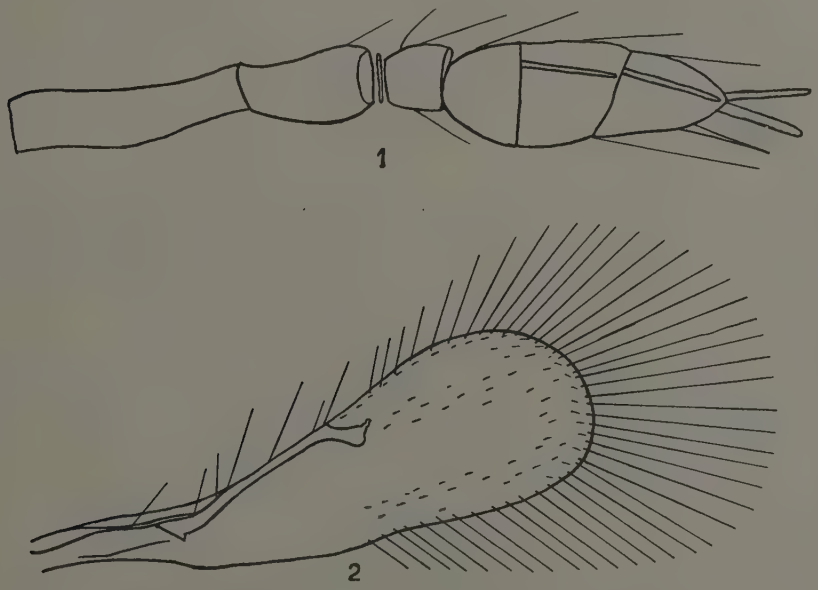
Measurements of the female : Antennae length 0.5 mm., fore wings length 1 mm., total body length 1 mm.

Type : 1 female on a slide in balsam (slide labelled : Giza, 16.11.1929, on *Convolvulus arvensis*).

Type in the collection of the Ministry of Agriculture, Giza.

Oligosita thoracica n. sp.

Female : Dark yellow-red, thorax, especially the scutellum white with a faint tint of yellow, last tarsal joint of all legs dark brown. Scape as long as club. Wings resembling those of *O. impudica* Kr.



Oligosita thoraciça nov. sp.: 1. Antenna. — 2. Fore wing.

Measurements of female : Length of antennae 0.5 mm., length of fore wing 0.9 mm., total body length 0.8 mm.

Five specimens (females) swept from grasses.

Locality : Egypt (Pyramids Road, Giza), November 1931.

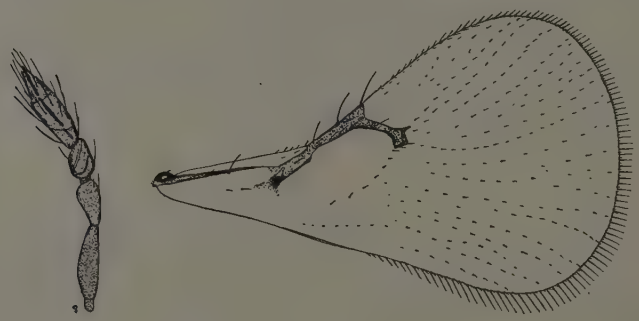
Type : 1 female, on a slide in Balsam (Slide engraved : Type, *Oligosita thoracica* Kryger, November 1931, Pyramids Road, Giza, on grasses; I. P. Kryger mounted).

Type in the collection of the Ministry of Agriculture, Cairo (Giza).

Neocentrobia hirticornis Bl.& Kr.

Entom. Medd., 16, 1928, p. 203.

Three females on slides in Balsam, each slide labelled : Egypt (Sohag), 13.8.1931, emerged 18-19.8.1931, Pomegranates (with *Siphoninus granati* Pr.). The slides in the collection of the Ministry of Agriculture, Cairo (Giza).



1 2

Neocentrobia hirticornis Blood & Kryger; 1. Antenna of female. — 2. Fore wing.

The species is well known from various localities in the Southern part of England.

Trichogramma evanescens Hal.

Several specimens, winged females and one winged male swept from grasses, Pyramids Road, Giza, November 1931.

The club of the male antenna indicates some articulation which is also known from some European males of this species.

MYMARIDAE.

Alaptus minimus Walker.

Together with *Sethosiella priesneri*, males and females of this species were also bred from vine leaves, attacked by *Retithrips*.

The European species are known to be parasites of *Psocus*-eggs, and it is possible that the Egyptian specimens have also hatched from eggs of Psocids which may have been on the vine leaves.

Contributions towards a knowledge of the Thysanoptera of Egypt, VII.

(with 2 Text-Figures)

by H. Priesner.

17. A brachypterous Rhipidothrips from the Nile valley :

Rhipidothrips cahirensis, spec. nov.

Female : Blackish brown with reddish tint, thorax, particularly the pterothorax dark reddish brown, paler than the remaining body ; femora dark brown, tibiae as well, but the fore tibiae with about apical half, middle and hind tibiae with about apical third, and all tarsi whitish yellow ; the two basal joints of the antennae of the same colour as the head, joint 2 with whitish spot above, 3 clear whitish yellow, 4 evenly shaded with greyish yellow, the following joints blackish brown ; the long bristles of the body, and the wing pads colourless.

Head length with process 225 μ, width across eyes 178, near base 190 μ ; head slightly produced in front of the eyes ; ocelli present, small, front ocellus being a small dot ; one pair of tiny interocellar bristles present, in normal position ; behind the eyes a few very short, stout bristles ; eyes below produced far backward, thus reaching a length of 130 μ, while their lateral length is only 87 μ ; mouth cone normal. Antennae length 415 μ ; measurements of segments, as follows : 40-44(44), 56(31), 76(22), 68-72(24), 58(26), 44(26), 42(22), 18(14), 12-14(6) μ ; on joint 4 a broad, transverse, punctured sense area, leaving free the upper side, sense area on joint 3 hardly visible owing to the pale colour of this joint. Prothorax length about 180 μ, width 225 μ ; fore angles with a very small (20-22 μ) bristle which is directed forward, hind angles with a longer bristle, 48-50 μ. Fore legs thickened, fore tarsi with the usual hook-like tooth. Mesothorax width only 285 μ, metathorax narrower, width about 260 μ. Wings reduced to short, hyaline scales, having a length of 240 μ, with complete ring vein, and two short longitudinal veins which are set with tiny, colourless bristles. Bristles on segment 9 of the abdomen hyaline, b.1 about 130, b.2 longer, 180 μ, b.3 about as b.2, situated laterally, and farther removed from hind margin than the former bristles. Segment 10 not divided, provided with one pair of bristles which have a length of 140 μ. — Total body length (strongly contracted) : 1.66 mm.

Habitat : I swept but two specimens of this new *Rhipidothrips* from grasses, on March 27, 1930, near the Pyramids at a canal bank on the Sakkara road, in Giza Province.

The reduced wings, the short antennae, and the colouration of these and the legs, separate this species from all the others hitherto known.

18. A new Chirothrips species from the Nile valley.

Chirothrips was not known from Egypt, although there exist two species, viz., *Ch. meridionalis*, Bagnall, and the new species described below.

Chirothrips Africanus, sp. nov.

Female : Brown, thorax inside with orange-yellow pigment; fore tibiae towards apex, and fore tarsi pale yellow, middle and hind tarsi pale greyish yellow; wings brown-grey shaded, lighter towards base; antennae, joint 3 yellowish, 2 light at apical margin, the following joints dark, 4 may sometimes be lighter than the following joints.

Length of the triangle-shaped head 85 μ, breadth across hind angles of eyes 100 μ; length of eyes laterally 56 μ, of cheeks behind them about 14 μ; head laterally, in front of the eyes little produced, eyes flat, triangular; hind ocelli situated somewhat behind the level of the hind margin of eyes, interocellar bristles at sides of front ocellus but somewhat in front of them; beside these, there is only 1 pair of small bristles on fore head, about on the level of the fore margin of the eyes. Antennae length about 165 μ; measurements of segments : 16-18(28-29), 24(28), 24(21), 26(22), 18(18), 26(15), 10(5), 8(3) μ; joint three straight at outer margin, also at apical margin scarcely concave, 3 with tender stalk, and thick outer simple sense cone, as in joint 4, joint 6 at apex as 7 at base, obliquely truncate. Fore legs normal. Prothorax length 140 μ, breadth 212 μ; dorsal surface with interrupted cross-wrinkles; two pairs of bristles at hind angles, 32-34 μ, and 20-32 μ, respectively; 1 small bristle between them, and 5 pairs of hind marginals, inside. Width of mesothorax 235 μ; metathorax narrower, tapering towards hind margin. Fore wings as usual, length 0.657 mm.; upper vein only visible for half the length of the wing, lower vein even shorter, terminating with the former or before it; upper vein usually with 4+3 basal, and 1+1 distal bristles, lower vein with only 1+2 or 3+1 bristles throughout its length, the 1st one at its origin. Abdomen normal, pleural plates with stout teeth at hind margins; shape of abdomen about as in the European species *manicatus* Hal., shortly pointed; bristles on segment 9, b.1, 52-56 μ, b.2 as well, b.3, 72-76 μ; bristles on segment 10, 84, and 80 μ, respectively; segment 10 completely split. — Total body length (normally distended) : 1.03 mm.

Male (brachypterous) : Colouration lighter, particularly joint 2 of the antennae and the whole thorax; eyes even flatter and smaller, lateral length only 46 μ, produced part laterally 8-10 μ; head length 92 μ; breadth behind 88 μ; ocelli wanting, 1 very tiny bristle at inner margin of eyes, about

in its middle, and 2 pairs of anteocellars at fore angles of eyes, the outer of these tiny bristles within the angles of the head projection; length of cheeks 16-20 μ, inner distance of eyes 38 μ. Length of antennae 156 μ; measurements of segments : 28(31), 22(25), 22(22), 25(24), 17(18), 21-22(15), 7-8(6), 6-7(3) μ; shape of segment 2 and cone of joint 3 and 4 as in female. Prothorax length 154, breadth 190 μ; inside the very short hind angle bristles with 6 to 7 pairs of tiny bristles. Mesothorax width 200-208 μ. Wing pads' length 44-48 μ: they are densely covered with microsetulae. Lateral bristles on tergit 9 of the abdomen about 60 μ. Glandular areas on sternites 3 to 7 small, dot-like, punctured, their width about 20 μ. — Total body length with frontal parts distended : 0.92 mm.

Habitat: I repeatedly collected males and females of this species in Giza, viz., in November, February and March from turf, females in April on *Cynodon dactylon*, and in August on *Eragrostis bipinnata*. In Willcocks's collection I saw a specimen from cat's tail grass (March 1929).

This species is easily distinguished from *Ch. meridionalis*, Bagnall, which is distributed over Egypt, as well, by the much less elongated, and produced end of the abdomen, the much less sharply pointed, non-concave joint 2 of the antennae, the much bigger joint 1, the laterally distinctly visible projection of the head, which is wanting in *meridionalis*, furthermore by the shorter cheeks; the hind angle bristles of the prothorax are shorter, too, than in *meridionalis*, in which species the males are, at least in Egypt, always macropterous.

The new species is much more closely allied to *Ch. manicatus*, Hal., but the 2nd antennal joint is not concave at outer margin, *and has no bristle at the very apex*, while in *manicatus*, there is a very tiny hair at the tooth-like apex; the laterally visible projection of the head is shorter than in *manicatus*, and is very much as in *pallidicornis*, Pr., a European species which was discovered in Hungary but recently found in Germany, and Spain, as well; *Ch. pallidicornis*, however, has more bristles on the lower vein of the fore wings, on an average, and longer prothoracic bristles, and a tiny apical bristle on the tip of the 2nd joint of the antennae which is wanting in *africanus*. The male of *manicatus* has much larger glandular areas of the sternites, than that of *africanus;* the male of *pallidicornis* is unfortunately not yet known.

19. The hitherto underscribed male, and the larva of Anaphothrips alternans, Bagnall, a thrips on cereals in Egypt :

Anaphothrips alternans, Bagn.

1913, Bagnall (*Euthrips alternans*), Ann. Mag. Nat. Hist., Ser. 8, vol.XII, p. 291.

1914, Karny (*Euthrips alternans*), Zeitschr. wiss. Ins.-Biol., p. 357,

1922, Willcocks (*Anaphothrips* sp.), A Survey of the more imp. insects.., I, pp. 66, 72.

1925, Willcocks (*Anaphothrips* sp.), II (The Insects and rel. pests of Egypt...), pp. 83, 149-150, 196, Pl. XI, fig. 5, 6.

1929, Moulton (*Anaphothrips alternans*), Florida Entomologist, XIII, 4, p. 61.

The eggs and the female of this insect which is only known from Egypt and Cuba (West Indies), are described, and beautifully illustrated (Pl. XI, fig. 5, 6) by Willcocks (t.c.p. 149) ; also the male and the larvae are mentioned by the same author (t.c.p. 150, and 149, respectively) but no description was given because he was not quite sure whether the males and females he found belonged together. Descriptions of male and larva may therefore be given here.

Male.

The male is very different from the female, it is much smaller, unicolourously yellow, and therefore difficult to detect.

The whole body pale yellow, legs as well, eyes black, parts of the mouthcone brownish ; joints 1 and 2 of the antennae are clear yellowish, 3 yellow, sometimes scarcely noticeably shaded, 4 yellow or faintly shaded, light at base, 5 more distinctly shaded at apex, faintly shaded or yellow at basal third or half, the following joints dark brown. Bristles on body pale.

Head length about 100 μ, breadth across eyes 108 μ, head somewhat constricted behind eyes ; no conspicuous bristles on the head ; mouth cone normal, maxillary palpi 3-segmented. Antennae stouter than in the female, their length of about 200 μ ; measurements of the antennae, 14(22), 28-29(22), 31-34(17), 28-31(15), 31-32(15), 42-43(14), 8-9(7), 10-13(5) μ. Sense cones on joints 3 and 4 simple ; joint 5 laterally convex, distinctly narrowed towards tip, 6 spindle-shaped. Prothorax length about 96 μ, width 144 μ, without bristles. Mesothorax width 727-744 μ ; wings probably reduced to very tiny scales, not entirely wanting. Tergite 9 of the abdomen with two pairs of thorns above, the anterior, median pair of which has a length of 14-15 μ, the posterior, outer pair, 11-13 μ ; laterally, on either side of the disk with one long bristle (62 μ) ; the long lateral bristles of segment 9, 70 μ. Pale glandular areas on the sternites are not visible, they are certainly very narrow, strongly transverse, when they are present. — Total body length : 0.6-0.7 mm. ; discended 0.9 mm.

Larva.

2nd Stage : Pale yellow with blackish eyes, greyish interantennal spot, grey hind margin of tergit 9 of the abdomen, the apical two thirds of seg-

ment 10 broadly shaded with grey; femora grey in basal half, tibiae so in outer margins; antennae pale grey, apices of joints 1 to 3 whitish, as usual, the terminal joint of the antennae not markedly darker than the large joint 5.

Head length about 102-104 μ, breadth across eyes 92 μ, distance of eyes from base of antennae 12-14 μ; head bristles very small and tender, a fore eye bristle of a length of about 12-14 μ. Antennae length 170 μ; measurements of joints, 11-13 (b.25, ap.20), 25(21), 42(21), 42+8(20), 10-11(11), 21(6-7) μ. Microsetulae on joint 3 not visible, very tender on joint 4, joint 6 gibbose. Hind angle bristles of the prothorax short, 22-24 μ, open at tip, fringed or somewhat funnel-shaped. Abdomen with distinct cross-rows of small keels, without microsetulae, bristles increasing in length towards apex of abdomen, well developed, bent, *open or fringed at tip on basal segments, bristles of the last segments as well* but, as a rule, fringed *before* tip, looking fissured, so that they can be pointed at the very end, their length therefore varying considerably; their length on segment 8 about 40-44, on segment 9, sometimes entirely pointed, 52-56 μ; the dark hind margin of segment 9 is hardly visibly crenulated; the almost entirely dark segment 10 is evenly convex at hind margin, b.1 pointed, about 52 μ in length.

The larva is described from specimens taken from Maize, and *Scirpus*.

Other host plants are : *Sorghum vulgare*, *Andropogon halepensis*, *Polypogon monspeliensis*, and *Triticum* (wheat).

20. A new genus of the Family Thripidae :

Dorcadothrips, gen. nov. (1)

Antennae tender, 8-segmented (style long, two-segmented). Head process present but *very* short. Head somewhat broader than long. *Mouth cone short*, broadly rounded, maxillary palpi two-segmented. Legs slender, simple. Prothorax at hind angles with two pairs of long bristles. Wings of female as in *Diarthrothrips* or *Trichromothrips*, reduced in the male. Segment 10 of the abdomen of female *not* split above. Male with two long, gazelle-horn-like appendices, originating from the dorsum of segment 9 of the abdomen.

Typus generis : *Dorcadothrips caespitis*, sp.nov.

Near *Plutonothrips*, Pr., *Diarthrothrips*, Will., or *Trichromothrips*, Pr. — Distinguished from the first named genus by the 2-segmented maxillary palpi, the much shorter sense cones of the antennae, and the brachypterous male; from *Diarthrothrips* by the latter character, and the fork-like processes of the male, and, in both sexes, by the shape of the antennal segments 3 and 4; from *Trichromothrips* by the peculiar development of the 9th tergit of the male, and the less distinct head-process.

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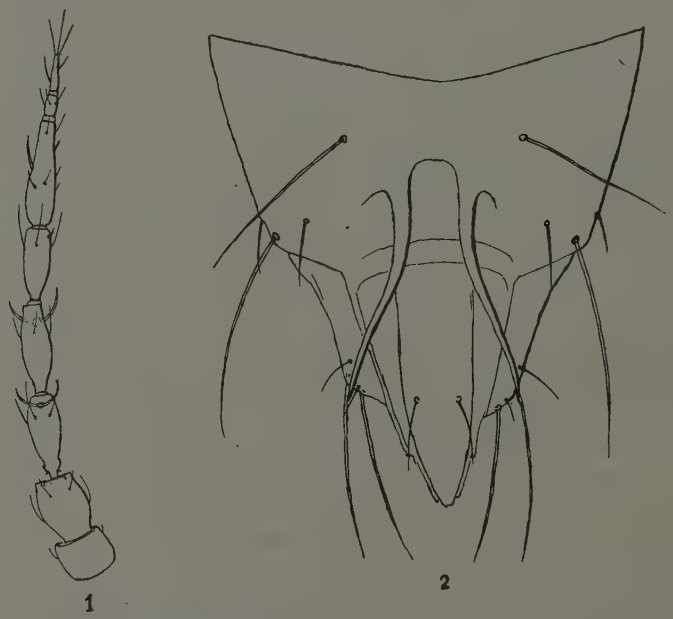
(1) Δορκὰς =gazelle (because of the peculiar male character which has the shape of gazelle-horns),

Dorcadothrips caespitis, sp. nov.

Female: Pale yellow, thorax sometimes with indistinct, very pale grey markings, sides of the tergites 2 to 6 of the abdomen near fore margins on each side with a pale grey double spot. Legs pale yellow or femora and tibiae



Dorcadothrips caespitis nov. gen. & nov. spec.:
1. Antenna of female. — 2. 9th and 10th abdominal segment of male, dorsally.

indistinctly with greyish outer margins. Wings shaded with greyish yellow. Antennae with segment 1 pale yellow, 2 indistinctly shaded, 3 pale yellow, but apical half somewhat shaded, 4 whitish yellow in basal half or third, also joint 5 whitish at the very base, the remaining parts grey. Ocelli zinnabar, eyes black. Bristles on body light.

Head length about 112-120, from the eyes only 96 μ, breadth across eyes 140-146 μ, across base 132-148 μ, across the narrowest width behind eyes, only 138 μ; eyes laterally 58 μ; coarsely facetted, very scarcely pilose; all bristles on head tender, the interocellars in normal position, and moderately long; antennae inserted not right on the fore angles of the eyes, but on a very short processus which medianly measured has a length of 25 μ; it is deeply emarginated in front. Mouth cone very short, labium broadly rounded, maxillary palpi 2-segmented. Antennae length 295 μ; measurements

of segments: 24(31), 36(27), 50-52(20), 48(20), 42(15), 58-60(17), 15(8), 20-22(5) μ. Joint 3 as shown in fig. 1, of quite an other shape as in *Diarthrothrips coffeae*, Will., sense cones very tender, forked but only moderately long, joint 4 only indistinctly constricted towards apex, joint 5 almost parallel-sided, not narrowed towards tip, joint 6 very slender, broadest near base, style long and slender, joint 1 decidedly longer than broad. Prothorax length 128-140 μ, width 172-200 μ, broadest near base, fore angles with only very tiny bristles, hind angles with 1 pair of long (64-68 μ) bristles each; hind margin, in addition, with only two pairs of bristles, the inner of which, 35 μ, is much longer than the outer. Fore legs normal, tarsi slender. Mesothorax width 240-250 μ. Length of wings about 0.74 mm.; costa width about 20, upper vein with 3+4 basal, and 2 (exceptionally only 1, near tip; or 1+2) distal bristles, lower vein with 9 to 11 bristles. Tergit 8 without comb. Ovipositor length 235 μ. Bristles on segment 9, 92-96, 104-108, and 120 μ; bristles on segment 10, 124-128 μ; all these bristles pale yellowish, tender. Segment 9 and 10 considerably long, 10 not split above. — Total body length (normally distended): 0.21-0.22 mm.

Male (brachypterous): Length 0.86 to (distended) 1.1 mm. Head width 124-128 μ; ocelli distinct, interocellar bristles well 40 μ. Width of mesothorax 188 μ. Length of antennae 277 μ; measurements of segments, 20(27-28), 32(23), 44(16), 44(17), 38(14), 54-56(15), 12(8), 20(5) μ. Wings rudimentary, invisible. Tergit 9 as shown in fig. 2, with two separated long, yellowish, S-shaped, chitinous thorns (length 70-80 μ), hind margin of the segment somewhat sinuated, and probably impressed; disk of the segment with a bristle on either side (52 μ), hind angles with a longer one (84-88 μ). Tergit 10 triangular, medianly somewhat produced beyond the lateral parts.

Larva.

2nd Stage: The larva offers no peculiarity. Its short broad mouth cone indicates that it belongs to the above genus. It is pale yellow, without dark markings, femora shaded pale grey only in basal third, tibiae pale grey, with a thin colourless ring just beyond base. Antennae pale greyish yellow, joint 2 somewhat darker.

Head broader than long, its width across eyes about 112 μ; distance of eyes from base of antennae 20-24 μ. Antennae length 192 μ; measurements of joints, 16-20(28), 32(23), 44(25), 44+12(24), 16(12), 26-28(8) μ; joint 4 with distinct microsetulae. All body bristles pointed, hind angle bristles of the prothorax 44-48 μ. Abdomen without small tubercles, the basal segments sparsely set with exceedingly tiny microsetulae which are almost invisible on the apical segments; they are, therefore, practically smooth. Bristles on segment 9 thin, strongly bent, B.1 probably 48 μ. No comb on segment 9.

Habitat: I found this species in both sexes with the larvae on various localities, in Autumn (September until December) in Giza, mostly in *Citrus* groves in turf, especially on *Panicum colonum*.

Seance du 12 Avril 1932

Présidence de S.E. le Dr. MOHAMED SHAHINE Pacha, Président.

Communications

Studies on the Ecology of Palestinean Coleoptera:

I. Coleoptera at light-traps.

by F. S. Bodenheimer, Jerusalem.

During the years 1925-1930 some light-traps (model Williams) have been in activity at the following localities in Palestine:

Ben Shemen, near Ludd (2 ½ years; abbreviation: B).
Gebatha, Plain of Esdraelon (1 ½ years; abbr.: G.).
Atta, near Chederah (1 ½ years; abbr.: C).
Kirjath Anawim, 16 kilom. west of Jerusalem (2 years; abbr.: K).
Tel Chaj, Upper Galilee (½ year; abbr.: T).
Jordan, near Allenby Bridge (½ year; abbr.: J).

The whole of the Coleoptera resulting from these catches have been determined by Dr. S. Tenenbaum, Varshaw, to whom the authors best thanks are due for this laborious task. 10.015 specimens have been determined up to date. Only relatively few specimens await still their determination.

The result is a list of 261 species of beetles, 174 of which are new to the fauna of Palestine. The large majority consists of small to very small species of nocturnal activity. The following list illustrates their distribution over the different months of the year as well as the localities of their appearance in the traps. The quantitative data for the different months give for many species a fair account of their life history, especially the time of appearance of the adult beetles.

Systematic list of the Coleoptera from the light-traps.

I. Cicindelidae: 1

1. *Cicindela* sp. — G; VII: 1.

II. Carabidae: 38

2. *Clivina sacra* Putz. — G, C, B; VI: 12, VII: 27, VIII: 6. — G: 42.
3. *Bembidion praestum* Dej. — B, G, K; IV: 2, V: 1, XI: 1, XII: 1.
4. *Bembidion vicinum* s. *subplagiatum* Sahlb. — B; IV: 1.
5. *Tachys lucasi* Duv. — B; IV: 1, VI: 6, VII: 14, VIII: 10, IX: 30, X: 9, XI: 2.
6. *Tachys haemorrhoidalis* Dej. — B, G; V: 2, VI: 12, VII: 25, VIII: 9, IX: 3.—G: 22, B: 27.
7. *Tachys cardioderus* Chaud. — G, B; VI: 1, VII: 2.
8. *Tachys bistriatus* Dft. — B, G, C; III: 1, IV: 1, V: 3, VI: 41, VII: 27, VIII: 5, IX: 6. — G: 36, B: 46.
9. *Tachys grandicollis* Chaud. — B; VII: 2, VIII: 2, IX: 2.
10. *Limnastis galilaeus* Pioch. — B, G; VI: 1, VII: 6, VIII: 1.
11. *Trechus quadristriatus* Schrk. — B, T; IV: 3, XI: 1, XII: 9.
12. *Apotomus flavescens* Apetz. — B, G; VI: 13, VII: 10, VIII: 4, IX: 1.— G: 17, B: 11.
13. *Chlaenius vestitus* Payk. — C; IX: 1.
14. *Chlaenius festivus* v. *caspius* Motsch. — B; VII: 1.
15. *Amblystomus metallescens* Dej. — B, G; VI: 7, VII: 4.
16. *Carterus longipennis* Chd. — G; VI: 36, VII: 771, VIII: 200, IX: 2, X: 3.
17. *Eucarterus sparsatus* Reitter. — G; VII: 1.
18. *Eriotomus palaestinus* Pioch. — B; VI: 1, VII: 2, VIII: 1.
19. *Eriotomus semiobscurus* Pic. — B, G; VI: 3, VII: 15, IX: 1. — G: 15.
20. *Ophonus judaeus* Pioch. — G; VII: 18, VIII: 110, IX: 4.
21. *Parophonus planicollis* Dej. — G; VI: 1, VII: 2.
22. *Harpalus azureus* F. — G; VII: 5.
23. *Harpalus tenebrosus* Dej. — B; VI: 1, IX: 1, X: 3.
24. *Stenolophus abdominalis* Gené. — B, C, G; IV: 1, VI: 9, VII: 2, IX: 1.
25. *Acupalpus elegans* Dej. — B, J; IV: 1, VI: 1.
26. *Acupalpus dorsalis* + a. *notatus* Muls. + a. *maculatus* Sch. + a. *lusitanicus* Reitter. — B, G; VI: 12, VII: 4. — B: 15.
27. *Acupalpus luteatus* Dft. — B; VI: 4.
28. *Anthracus quarnerensis* Reitter. — B; IV: 1, VI: 1.
29. *Anthracus longicornis* Schaum. — B; VII: 2.
30. *Pterostichus bonvoisini* Rche. — J; IV: 1.
31. *Laemostenus venustus* Clairv. — K; V: 1.

32. *Metabletus lateralis* Motsch. — C, G ; VI : 6, VII : 4. — G : 7.
33. *Microlestes plagiatus* Duft. — B ; VII : 1.
34. *Microlestes baudii* Frm. — G ; VII : 2.
35. *Singilis plagiata* Rche. — B ; VIII : 1.
36. *Singilis fuscipennis* v. *libani* Sahlb. — G ; VII : 1, IX : 4, X : 3.
37. *Zuphium chevrolati* Cast. — C, G ; V : 1, VII : 1, VIII : 4, IX : 1.
38. *Zuphium olens* Rossi. — C ; VI : 1.
39. *Brachynus berytensis* Rche. — G ; VII : 1.

III. Staphylinidae : 28

40. *Planeustomus miles* Gr. — C ; VI : 1.
41. *Planeustomus cephalotes* Ev. — J ; V : 3.
42. *Planeustomus heydeni* Epp. — J ; VII : 1.
43. *Trogophlœus bilineatus* Steph. — B, G ; V : 21, VI : 63, VII : 7, VIII : 4, IX : 1. — B : 94.
44. *Trogophlœus nigrita* Woll. — B, G ; VII : 2, XI : 3.
45. *Trogophlœus obesus* Kiesenw. — B ; VIII : 1.
46. *Trogophlœus pusillus* Grav. — B ; VI : 1, VII : 1.
47. *Trogophlœus fuliginosus* Grav. — B ; VI : 2, VII : 10.
48. *Oxytelus sculptus* Grav. — B, G, T, K ; IV : 5, V : 5, VI : 84, VII : 24, VIII : 2, X : 1. — B : 104.
49. *Oxytelus piceus* L. — B, G, C ; VI : 5, VII : 1, X : 1, XI : 6. — G : 7.
50. *Oxytelus nitidulus* Grav. — B ; VII : 1.
51. *Platystethus cornutus* Grav. — B ; X : 1.
52. *Bledius fracticornis* Payk. — C, J ; IV : 1, V : 1, VI : 1.
53. *Astenus angustatus* Payk. — B ; V : 1, VI : 1.
54. *Astenus filiformis* v. *anguinus* Baudi. — B ; VII : 1.
55. *Scopaeus debilis* Hochh. — B, G ; VI : 21, VII : 20, VIII : 1.
56. *Medon ochraceus* Grav. — B, G ; V : 3, VI : 28, VII : 8, VIII : 1, IX : 4, X : 1.
57. *Scimbalium pubipenne* Fairm. — B, G, C ; V : 1, VI : 35, VII : 30, VIII : 1.
58. *Dolicaon biguttulus* Boisd. — G ; VI : 1, VII : 2, VIII : 1.
59. *Leptacinus bathychrus* Gyll. — B, C ; VI : 6, XI : 1.
60. *Leptacinus parumpunctatus* Gyll. — B ; VI : 1.
61. *Philonthus nigritulus* Grav. — B ; V : 1, VI : 1.
62. *Philonthus punctus* Grav. — C ; VIII : 1.
63. *Philonthus concinnus* Grav. — B ; V : 2.
64. *Tachyporus nitidulus* F. — B, G, K ; V : 2, VI : 1, XII : 1.
65. *Atheta sordida* March. — B ; VII : 1.
66. *Microglotta marginalis* Grav. — G ; IX : 1.
67. *Aleochara tristis* Grav. — B ; VI : 1.

IV. Pselaphidæ : 10

68. *Brachygluta paludosa* Peyr. — G ; VII : 5, XI : 2.
69. *Brachygluta* sp., ♀. — B ; VI : 1.
70. *Reichenbachia opuntiae* Schm. — B ; VI : 2.
71. *Reichenbachia antennata* Aubé. — G ; VII : 2, XI : 6.
72. *Bryaxis gigas* Bdi. — C, G ; V : 1, VI : 5, VII : 2.
73. *Bryaxis sanguinea* Reichb. — G ; VII : 1.
74. *Ctenistes palpalis* Reichb. — B, C, G ; III : 1, IV : 3, V : 8, VI : 82, VII : 30, VIII : 3, IX : 10, X : 6, XI : 8, XII : 1. — G : 125.
75. *Enoptostomus globulicornis* Motsch. — B, G ; V : 2, VI : 19, VII : 130, VIII : 119, IX : 143, X : 5, XI : 1. — G 1926 : 47 ; 1927 : 340.
76. *Centrophthalmus tenenbaumi* Roub. — B ; VI : 1.
77. *Ctenistomorphus elaniticus* Raffr. — B ; VI : 1.

V. Orthoperidae : 1

78. *Orthoperus* sp. — B ; VI : 1, VII : 2.

VI. Hydrophilidae : 2

79. *Hydrochus angustatus* Germ. — B ; VI : 1.
80. *Cercyon quisquilius* L. — B, J, C, K ; IV : 36 ; VI : 9, VII : 8, VIII : 2, IX : 1, X : 2, XI : 26.

VII. Lampyridae : 5

81. *Lampyris nervosa* Oliv. — G, K ; VI : 32, VII : 69 ; G : 70.
82. *Lampyris lucifer* Rche. — G, B ; IV : 3, V : 3, VI : 2, VII : 8.
83. *Lampyris maculicollis* Muls. — T ; IV : 20, V : 1.
84. *Lampyris maculicollis* var. *delagrangei* Pic. — G ; V : 23, VI : 67.
85. *Lampyris tenenbaumi* Pic + ab. *innotata* Pic. — B ; IV : 14, VI : 6.

VIII. Cantharidae : 5

86. *Rhagonycha nigritarsis* Brullé. — G, T, B ; IV : 1, V : 5, VI : 2.
87. *Rhagonycha chevrolati* Mars. — T ; IV : 2.
88. *Rhagonycha tripunctata* Rche. — B ; IV : 1.
89. *Malthinus longithorax* Pic. — G ; V : 3.
90. *Cantharis livida* ab. *melaspis* Chevr. — J ; IV : 1.

IX. Malachiidae : 1

91. *Hypebaeus versiculiger* Mars. — B ; V : 1.

X. Drilidae: 3

92. *Cydistus zurcheri* Bourg. — B; VI: 1.
93. *Pterydrias debilis* Reitter. — B, G; VI: 1, VII: 49; G: 31.
94. *Drilus rectus* Schauf. — B; V: 7.

XI. Cucujidae: 5

95. *Monotoma picipes* Hbst. — B; VIII: 1.
96. *Silvanus surinamensis* L. + a. *mercator* Fauv. — G, C; III: 3.
97. *Laemophloeus testaceus* F. — B; VI: 1.
98. *Ahasverus advena* Waltl. — G, B; VI: 1, VII: 3, X: 1.
99. *Monanus signatus* Frauenf. — G; VII: 1.

XII. Cryptophagidae: 5

100. *Leucohimatium arundinaceum* Forsk. — B, G; VI: 19, VII: 29, VIII: 107, IX: 48, X: 2, B: 200.
101. *Micrambe obcordata* Mrsh. — G; XI: 1.
102. *Cryptophagus affinis* St. — G, C; I: 2, II: 1, III: 1.
103. *Cryptophagus cellaris* Scop. — G; XII: 1.
104. *Ephistemus exiguus* Gr. — B; VI: 1.

XIII. Erotylidae: 1

105. *Cryptophilus integer* Heer. — B, G; VI: 5, VII: 11, VIII: 1; B: 16.

XIV. Phalacridae: 2

106. *Stilbus oblongus* Ev. — G; VII: 1, X: 1.
107. *Stilbus testaceus* Panz. — G; VII: 1.

XV. Lathridiidae: 7

108. *Corticaria elongata* Gyll. — G; X: 1.
109. *Corticaria bella* Redtb. — G; VIII: 1.
110. *Corticaria crenulata* Gyll. — B; XII: 1.
111. *Corticaria gibbosa* Hbst. — B; VII: 1.
112. *Melanophthalma fuscipennis* Mannh. — G, B; VI: 2, VIII: 1, IX: 1.
113. *Melanophthalma distinguenda* Com. — C, B; VII: 1, IX: 1.
114. *Migneauxia inflata* Rosenh. — B, G; VII: 15, VIII: 4, IX: 4.

XVI. Mycetophagidae: 1

115. *Typhaea stercorea* Gyll. — B, J, G; IV: 2, V: 3, VI: 20, VII: 11, VIII: 37, IX: 16, X: 14, XI: 8; G: 59.

XVII. Colydiidae: 1

116. *Myrmecoxenus vaporarium* Guer. — B; VI: 22, VII: 10, VIII: 11, IX: 1.

XVIII. Dermestidae: 1

117. *Attagenus bifasciatus* var. *simoni* Reitter. — K; III: 1.

XIX. Byrrhidae: 1

118. *Limnichus sericeus* Dft. — G; VII: 1.

XX. Elateridae: 9

119. *Adelocera candezei* Desbr. — B, T, K; IV: 21, V: 2; K: 20.
120. *Melanotus dichrous* Cr. — B; VI: 4.
121. *Melanotus fusciceps* Gyll. — B; VI: 2.
122. *Melanotus aemulus* Ev. — C, J, K, B, G; V: 3, VI: 53, VII: 31; G: 80.
123. *Oophorus grisescens* Germ. — J; III: 1.
124. *Aeolus obliteratus* Cand. — B; II: 1, III: 1.
125. *Drasterius bimaculatus* Rossi + a. *dorsalis* Reitter. — B, G, C; VI: 1, VI: 9, VII: 7, XII: 1.
126. *Neotrichophorus schaumi* Chd. — G; VII: 2.
127. *Neotrichophorus guillebeaui* Muls. — B; VI: 1.

XXI. Throscidae: 2

128. *Throscus obtusus* Curt. — B, G, C, J; V: 1, VII: 6, VIII: 7, IX: 25; G: 22.
129. *Throscus duvali* Bonv. — B; VIII: 3.

XXII. Buprestidae: 2

130. *Psiloptera rugosa* Palis. — J; IV: 1.
131. *Agrilus olivicolor* Kies. — K; V: 1.

XXIII. Bostrychidae: 2

132. *Rhizopertha dominica* F. — B; IV: 1.
133. *Scobicia chevrieri* Villa. — B, C, K; IV: 2, V: 1, VII: 3, VIII: 4, X: 3.

XXIV. Lyctidae: 1

134. *Lyctus impressus* Com. — B; IV: 1.

XXV. Anobiidae: 10

135. *Dryophilus forticornis* Ab. — B; II: 2.
136. *Dryophilus longicollis* Muls. — G; III: 1.
137. *Theca pilula* Aubé + ab. *laterufa* Pic. — B, K; V: 1, VI: 1.
138. *Xyletinus bucephalus* Ill. — B, G; V: 3, VI: 5, VII: 19, VIII: 26, IX: 21, X: 8.
139. *Sitodreya panicea* L. — B, K; I: 6, IV: 2, VI: 1, VII: 1.
140. *Lasioderma redtenbacheri* Bach. — B, G, C, T, K; III: 2, IV: 19, V: 11, VI: 25, VII: 95, VIII: 78, IX: 38, X: 10.
141. *Lasioderma serricorne* F. — B, G, T, K; IV: 20, V: 9, VI: 10, VII: 264, VIII: 265, IX: 125, X: 13.
142. *Lasioderma punctulatum* Reitter. — B, G; VI: 1, VII: 94, VIII: 76, IX: 16, X: 4, XI: 1, XII: 1.
143. *Lasioderma haemorrhoidale* Ill. + ab. *unicolor* Schilzky. — B; IV: 3, VII: 6, VIII: 7, IX: 14.
144. *Metholcus cylindricus* Germ. — J; V: 1.

XXVI. Ptinidae: 6

145. *Ptinus aureopilis* Desbr. — B, K, G; V: 1, VI: 8, VII: 2, VIII: 4, IX: 1, X: 1, XI: 1.
146. *Ptinus fur* L. — B; III: 1.
147. *Ptinus rugosicollis* Desbr. — B, G, C, K; III: 27, IV: 16, V: 38, XI: 1.
148. *Ptinus xylopertha* Rche. — B, G, C, K; III: 2, IV: 15, V: 9, VI: 11, VII: 2, VIII: 7, IX: 10, X: 2, XI: 1.
149. *Ptinus quadricornis* Pic. — B, G, T, K; III: 28, IV: 16, V: 11, VI: 5, VII: 68, VIII: 201, IX: 159, X: 70, XI: 14, XII: 7.
150. *Ptinus hirsutus* Pic. — K; IV: 8, V: 8.

XXVII. Aderidae: 1

151. *Aderus populneus* Panz. — B, G; VI: 6, VII: 6, VIII: 5, IX: 4, X: 1.

XXVIII. Meloidae: 1

152. *Mylabris cincta* Ol. — J, IV: 3.

XXIX. Anthicidae: 20

153. *Notoxus syriacus* Laf. — C; IV: 3, V: 1, VI: 1.
154. *Notoxus aristidis* Pic. — C; VI: 4.
155. *Mecynotarsus truqui* Mars. — B, C; VI: 1, VII: 4, VIII: 6, IX: 2, XII: 1.

156. *Formicomus ionicus* Laf. — B ; IX : 1.
157. *Formicomus coeruleipennis* Laf. — J ; XI : 2.
158. *Anthicus hispidus* Rossi. — B, G ; VI : 11, VII : 10, VIII : 5, IX : 1.
159. *Anthicus crinitus* Laf. — B ; VII : 2, VIII : 3, IX : 1.
160. *Anthicus crinitus* var. *longipennis* Desbr. — B, C ; VI : 8, VIII : 9, IX : 3.
161. *Anthicus debilis* Laf. — B ; VIII : 1.
162. *Anthicus debilis* var. *phoxus* Mars. — J, G ; IV : 1, VI : 1, VII : 2.
163. *Anthicus humilis* Germ. — B ; VIII : 1.
164. *Anthicus luteipes* Mars. — B ; VI : 1.
165. *Anthicus floralis* L. + ab. *syriacus* Bdi. — B, C, J, G ; IV : 11, V : 6, VI : 49, VII : 32, VIII : 38, IX : 35, X : 3, XI : 7, XII : 4.
166. *Anthicus quisquilius* Thoms. — B ; VI : 2, VIII : 1.
167. *Anthicus goebeli* Laf. — J ; IV : 2.
168. *Anthicus sulcithorax* Desbr. — G ; VII : 1.
169. *Anthicus niger* Ol. — B ; V : 1.
170. *Anthicus tristis* Schm. — C ; XII : 1.
171. *Leptaleus arabs* Mrsh. — G ; VI : 1.
172. *Eudomia tenuicollis* Rossi. — G, B ; VI : 2, VII : 1, VIII : 2.

XXX. Scraptiidae : 3

173. *Scraptia libanica* Pic. — B ; IV : 1.
174. *Scraptia ? ferruginea* Kiesw. — B ; IV : 1.
175. *Scraptia ophthalmica* Muls. — G ; V : 54, VI : 13.

XXXXI. Mordellidae : 1

176. *Anthobates defarguesi* ab. *chobauti* Csiki + ab. *immaculata* Pic. — B ; VI : 1, VII : 1, VIII : 40, IX : 4.

XXXII. Lagriidae : 1

177. *Lagria tenenbaumi* Pic. — G ; V : 1, IX : 18, X : 25.

XXXIII. Alleculidae : 2

178. *Mycetocharina orientalis* Faust. — B, G ; V : 38, VI : 59, VII : 11, VIII : 1 ; G : 104.
179. *Omophlus syriacus* Muls. — K ; VI : 1.

XXXIV. Tenebrionidae : 11

180. *Himatismus villosus* Haag. — J ; III : 2, IV : 6, X : 2, XI : 21.
181. *Stenosis dilutipes* Reitter. — C ; III : 2, VIII : 2, X : 1, XII : 5.

182. *Opatropis hispida* Brullé. — C ; VII : 1.
183. *Alphitophagus bifasciatus* Say. — B, G ; II : 1, V : 2, VI : 8, VII : 13, VIII : 29, IX : 7, X : 2, XI : 2.
184. *Palorus subdepressus* Woll. — B ; V : 1, VI : 1, VII : 1, VIII : 1.
185. *Tribolium confusum* Duv. — G, C, B ; II : 2, III : 1, V : 2, VII : 1.
186. *Tribolium castaneum* Hb. — G, T ; V : 1, VII : 1, VIII : 1, X : 1, XI : 1.
187. *Cylindronotus valgus* Bdi. — K ; II : 1, IV : 1.
188. *Cabirus obsoletus* Bdi. — G ; II : 1.
189. *Cabirus rotundicollis* Mill. — C ; III : 2, IV : 2, V : 1, XI : 2, XII : 3.
190. *Mesomorphus longulus* Rche. — G ; VIII : 7, IX : 6, XI : 1.

XXXV. Chrysomelidae : 18

191. *Chaetocnema tibialis* Ill. — G, B ; VII : 3.
192. *Psylliodes chrysocephala* ab. *collaris* Weise. — C ; IV : 1.
193. *Psylliodes circumdata* Redt. — G ; II : 1.
194. *Haltica ? fruticola* Weise. — J ; V : 32.
195. *Hermeophaga ruficollis* Luc. — B, K, T, G ; I : 24, II : 6, III : 17, IV : 1, V : 7, VI : 9, VII : 361, VIII : 1235, IX : 208, X : 21, XI : 5, XII : 14 ; G : 1564, Bca : 400.
196. *Phyllotreta cruciferae* Goeze. — G, B ; V : 1, VII : 6, VIII : 1, IX : 2.
197. *Aphtona flaviceps* All. — B, C ; VI : 8, VII : 52, VIII : 22, IX : 11, X : 1, XII : 1.
198. *Aphtona euphorbiae* Schrnk. — B ; II : 2.
199. *Aphtona pygmaea* Kutsch. — C, G ; II : 1, IV : 2, V : 1.
200. *Longitarsus ganglbaueri* Heik. — B ; I : 1.
201. *Longitarsus pellucidus* Foudr. — G, B, K ; I : 1, IX : 1, XI : 1, XII : 1.
202. *Longitarsus albineus* Foudr. — G ,B ; V : 1, VI : 1, VII : 8, XI : 1.
203. *Longitarsus absinthii* Kutsch. — B ; VII : 1.
204. *Longitarsus luridus* Scop. — G ; I : 69, II : 8, III : 4, V : 1, XII : 14.
205. *Longitarsus parvulus* Payk. — G ; I : 1.
206. *Longitarsus anchusae* Payk. — G ; II : 1.
207. *Longitarsus nigrofasciatus* var. *patruelis* All. — G, T ; I : 5, II : 1.
208. *Longitarsus obliteratus* Rush. — G ; I : 3, VI : 1, XII : 2.

XXXVI. Bruchidae : 8

209. *Bruchidius obscuripes* Gyll. — T ; IV : 3.
210. *Bruchidius meleagrinus* Géné. — K ; V : 1.
211. *Bruchidius bimaculatus* Ol. — G ; XI : 1, XII : 1.
212. *Bruchidius pusillus* ab. *sanremi* Schneid. — G ; I : 1.
213. *Bruchidius perparvulus* Boh. — G ; II : 1.
214. *Bruchidius lucifugus* Boh. — G ; VII : 1.

215. *Bruchidius velarius* ab. *plumbeus* Luc. + ab. *lividimanus* Gyll. + ab. *retamae* Vogel. — B; I: 1, III: 2, XII: 1.
216. *Acanthoscelides lallemanti* Mars. — B; VIII: 1, XI: 1.

XXXVII. Curculionidae: 17

217. *Strophosomus brunneus*. — T; VII: 1.
218. *Sitones limosus* Rossi. — B; I: 4, II: 3.
219. *Sitones crinitus* Hbst. — B; IV: 1, V: 3.
220. *Conorrhynchus ? brevirostris*. — J; V: 1.
221. *Hypera amalek*. — B; I: 1.
222. *Hypera reichei* Cap. — B, K; III: 1, IV: 1.
223. *Phytonomus subvittatus* Cap. — B, T; I: 3, II: 1, IV: 1, V: 1, XII: 2.
224. *Phytonomus variabilis* Hbst. — T, C; I: 1, IV: 2, V: 1.
225. *Procas armillatus* F. — B; I: 1.
226. *Smicronyx basalis* Schultze. — B, G; I: 3, II: 58, III: 241, IV: 333, V: 26, VI: 1, XII: 6; G: 652.
227. *Smicronyx jungermanniae* Reiche. — B, G; VI: 5, VII: 2, VIII: 1.
228. *Smicronyx biscrensis*. — G; VI: 2.
229. *Apion malvae* F. — B; VIII: 2.
230. *Apion varipes* Germ. — B; XII: 1.
231. *Apion ononicola* Bach. — B; IX: 1.
232. *Apion miniatum* Germ. — K; IV: 1.
233. *Apion ? Brenskei* Desbr. — C; IV: 1.

XXXVIII. Ipidae: 1

234. *Xyleborus saxeseni* Ratz. — B; VII: 1.

XXXIX. Scarabaeidae: 27

235. *Trox granulipennis* Fairm. — B, K; I: 1, X: 1.
236. *Psammobius laevicollis* Klug. — G, B; VIII: 2, IX: 5, X: 2.
237. *Rhyssemodes orientalis* Muls. — C, J;
238. *Pleurophorus caesus* Panz. + ab. *elongatulus* Muls. — B, K, J, G; III: 2, IV: 132, V: 18; J: 151.
239. *Aphodius nitidulus* F. — B, T, G, J; IV: 53, V: 57, VI: 4, VII: 3, X: 1.
240. *Aphodius immundus* Creutz. — B; III: 1, IV: 8, IX: 4, X: 66, XI: 53, XII: 10.
241. *Aphodius klugi* Schm. — B, C; IV: 1, V: 2, VI: 1.
242. *Aphodius trucidatus* Hard. — B; II: 1.
243. *Aphodius lividus* Oliv. — B, K; IV: 2, V: 1, VI: 2, VII: 3, VIII: 1, IX: 2.

244. *Aphodius linearis* Rche. — B, T, G, J ; I : 18, II : 14, III : 6, IV : 6, V : 3, VI : 14.
245. *Aphodius sitiphoides* Orb. — B ; VI : 8, VII : 5, VIII : 16, IX : 4, X : 1.
246. *Aphodius hydrochaeris* F. — B ; I : 1, II : 2, X : 1, XI : 1.
247. *Aphodius lineomargo* Reitter. — B, T, K, G ; I : 26, II : 15, III : 34, IV : 3, V : 54, VI : 3, VII : 1, XI : 1, XII : 6 ; B : 55, G : 29.
248. *Aphodius angustatus* Klug. — C, B, G, J ; V : 6, VI : 2, VIII : 1.
249. *Aphodius vitellinus* Klug. — B ; VI : I.
250. *Aphodius aequalis* Reitter. — G ; IV : 1, V : 1.
251. *Aphodius varians* Dft. + ab. *fabricii* Orb. — J ; III : 1, IV : 1, V : 3.
252. *Aphodius discedens* Schm. — J ; IV : 1.
253. *Onthophagus cruciatus* Mén. — B ; V : 1.
254. *Copris hispanus* L. — B, K, G ; I : 1, II : 7, III : 10, IV : 12.
255. *Haplidia nitidula* Kr. — K ; V : 10.
256. *Tanyproctus saulcyi* Rche. — B ; I : 2, II : 2.
257. *Adoretus graniceps* Reitter. — J ; V : 3, XI : 1.
258. *Tropinota squalida* Scop. — J ; IV : 1.
259. *Oxythyrea noemi* Rche. — J ; IV : 9.
260. *Potosia afflicta* Gory. — K ; V : 1.
261. *Gnaphalostetha bonvoisini* Rche. — K ; I : 22, II : 4, III : 5.

The following tables represent the number of individuals and the number of species from each of the larger families per month.

Table I.

The seasonal distribution of the species

Families	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Total
Carabidae	—	—	1	9	5	21	*26*	12	13	4	3	2	38
Staphylinidae	—	—	2	10	*17*	14	8	3	4	3	1	—	28
Pselaphidae	—	—	1	1	3	*6*	6	2	2	2	4	1	10
Lampyridae	—	—	—	3	3	*4*	2	—	—	—	—	—	5
Cantharidae	—	—	—	*4*	2	1	—	—	—	—	—	—	5
Drilidae	—	—	—	—	1	*2*	1	—	—	—	—	—	3
Cucujidae	—	—	1	—	—	2	*3*	1	—	1	—	—	5
Cryptophagidae	1	1	1	—	—	*2*	1	1	1	1	1	1	5
Lathridiidae	—	—	—	—	—	1	*3*	3	3	1	—	1	7
Elateridae	—	1	2	2	2	*5*	3	—	—	—	—	1	9
Anobiidae	1	1	2	4	5	*6*	6	5	5	4	1	1	10
Ptinidae	—	—	4	4	*5*	3	3	3	3	3	4	1	6
Anthicidae	—	—	—	4	3	*10*	7	9	6	1	2	3	20
Tenebrionidae	—	4	4	3	5	2	*5*	5	2	4	5	2	11
Chrysomelidae	7	7	2	3	*6*	4	6	3	4	2	3	5	18
Bruchidae	2	1	1	1	1	—	1	1	—	—	2	2	8
Curculionidae	6	3	3	*6*	5	3	2	2	1	—	—	3	17
Scarabaeidae	7	7	7	*13*	13	8	5	3	4	7	4	3	27
Other families	—	—	1	9	7	9	*11*	7	5	5	2	—	29
Total	24	25	32	76	83	103	73	60	53	40	32	26	261

Table II.

The seasonal distribution of the number of individuals.

Families	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Total
Carabidae	—	—	1	12	8	170	950	353	57	18	4	10	1583
Staphylinidae	—	—	6	40	253	109	12	6	4	10	1	—	441
Pselaphidae	—	—	1	3	11	110	170	122	153	11	17	1	599
Lampyridae	—	—	—	37	27	109	77	—	—	—	—	—	250
Cantharidae	—	—	—	5	9	2	—	—	—	—	—	—	16
Drilidae	—	—	—	—	7	2	49	—	—	—	—	—	58
Cucujidae	—	—	3	—	—	2	5	1	—	1	—	—	12
Cryptophagidae	2	1	1	—	—	20	29	107	48	2	1	1	212
Latridiidae	—	—	—	—	—	2	17	6	6	1	—	1	33
Elateridae	—	1	2	22	5	69	40	—	—	—	—	1	140
Anobiidae	6	2	3	44	25	43	379	432	214	35	1	1	1185
Ptinidae	—	—	58	55	67	24	72	212	170	73	17	7	755
Anthicidae	—	—	—	17	8	61	52	66	43	3	9	6	265
Tenebrionidae	—	5	7	9	7	9	17	40	13	6	27	8	148
Chrysomelidae	101	20	21	4	13	19	431	1258	222	22	7	32	2173
Bruchidae	2	1	2	3	1	—	1	1	—	—	2	2	15
Curculionidae	13	62	242	339	32	8	3	3	1	—	—	9	712
Scarabeidae	72	37	52	220	159	35	18	19	15	75	56	18	676
Other Families	—		1	49	100	132	73	112	70	52	35	—	622
Total	199	129	400	859	762	926	2395	2748	1016	309	177	95	10.015

For some families these tables give a rather representative picture. The seasonal activity of Staphylinidae, Pselaphidae, Lampyridae, Cantharidae, Curculionidae a.o. in nature is fairly well registered.

Some species should be excluded from this list as insignificant, because they are without any doubt neither positive phototactic, neither nocturnal in their habits. Their occurrence in the light-trap is due only to chance. This is true f.e. for *Cicindela*, *Cantharis*, *Attagenus*, *Psiloptera*, *Agrilus*, *Mylabris*, *Hypebaeus*, *Bruchidius*, *Xyleborus*, *Tropinota*, *Oxythyrea*, *Potosia* a.o. .

As significant members of the association, which is attracted by the light, we may regard those 37 species, of which 50 or more specimens have been trapped. It is true, that euryoec species, living in many habitats and of common occurrence in many of them, have a better chance, to reach this number, than other species, which are common only in one well circumscribed habitat or which are generally rare. But in any case these 37 species must be regarded as those beetles, which are more commonly attracted by light in Palestine. They are :

FAMILIES	SPECIES	Number of Specimens	Number of Stations
Carabidae	*Tachys lucasi*	72	B.
	Tachys haemorrhoidalis	51	B.G.
	Tachys bistriatus	84	B.G.C.
	Carterus longipennis	1012	G.
	Ophonus judaeus	132	G.
Staphylinidae	*Trogophloeus bilineatus*	96	B.G.
	Oxytelus sculptus	121	B.G.T.K.
	Scimbalium pubipenne	67	B.G.C.
Pselaphidae	*Clenistes palpalis*	152	B.G.C.
	Enoptostomus globulicollis	419	B.G.C.
Hydrophilidae	*Cercyon quisquilius*	84	B.G.C.J.K.
Lampyridae	*Lampyris nervosa*	101	G.K.
	Lampyroidea delagrangei	90	G.
Drilidae	*Pterydrias delilis*	50	B.G.
Cryptophagidae	*Leucohimatium arundinaceum*	205	B.G.
Mycetophogidae	*Typhaea stercorea*	111	B.G.J.
Elateridae	*Melanotus aemulus*	87	B.G.C.J.K.
Anobiidae	*Xyletinus bucephalus*	82	B.G.
	Lasioderma redtenbacheri	278	B.G.C.T.K
	Lasioderma serricorne	706	B.G.T.K.
	Lasioderma punctulatum	193	B.G.
Ptinidae	*Ptinus rugosicollis*	82	B.G.C.K.
	Ptinus xylopertha	59	B.G.C.K.
	Ptinus quadricorne	579	B.G.T.K.
Anthicidae	*Anthicus floralis*	185	B.C.J.G
Scraptiidae	*Scraptia ophthalmica*	67	G.
Alleculidae	*Mycetocharina orientalis*	109	B.G.
Tenebrionidae	*Alphitophagus bifasciatus*	64	B.G.
Chrysomelidae	**Hermeophaga ruficollis**	1908	B.K.T.G.
	Aphtona flaviceps	95	B.C.
	Longitarsus luridus	96	G.
Curculionidae	**Smicronyx basalis**	668	B.G.
Scarabeidae	*Rhyssemodes orientalis*	152	C.J.
	Pleurophorus caesus	118	B.K.J.G.
	Aphodius nitidulus	142	B T.G.J.
	Aphodius linearis	51	B.T.G.J.
	Aphodius lineomargo	143	B.T G.K.

The 5 most common species (in black type) form with 4813 specimens 48,5 % of all trapped beetles, the 37 most common species with 9506 specimens 94,9 % of the total. It is obvious, that this group is the significant representative of the beetles attracted to light. These species are at the same time the more common and euryoec species of the total as they are catched at an average of 3,1 localities against an average of 1,5 localities for all the species.

From the zoogeographical point of view it is of interest, that the general character of the light-trapped Coleoptera is much more northern (central-european) than that of any other ecological group of palestinean beetles known to the author. There are relatively few species, which could not have been catched as well in France, S. Germany or N. Italy.

Owing to their normal habitat and activity we may divide between the following groups :

Inhabitants of humid places, swamps, etc. : *Clivina*, *Tachys*, *Chlaenius*, *Acupalpus*, *Planeustomus*, *Scopaeus*, *Medon*, *Brachygluta*.
Inhabitants of ± arid places : *Ophonus*, *Harpalus*.
Inhabitants of water and water-shore : *Hydrochus*, *Trogophloeus*, *Stilbus*.
Inhabitants of dung and rottening substances : *Cercyon*, *Oxytelus*, *Leptacinus*, *Philontus*, *Myrmecoxenus*.
Feeding on moulds : *Cryptophagus*, *Cryptophilus*, *Corticaria*, *Migneauxia*, *Typhaea*, *Mycetocharina*, *Alphitophagus*.
Feeding on dry plants : *Lasioderma*, *Ptinus*, *Xyletinus*, *Tribolium*.
Generally known as nocturnal : *Ctenistes*, *Enoptostomus*, *Pterydrias*, *Adelocera*, *Melanotus*, *Lampyridae*.

I am not informed, if the nocturnal habits of Anthicidae, Halticinae, *Smicronyx* a.o. have been realised hitherto. Scarabaeids are generally known from light. But the strong positive phototaxis of the genus *Aphodius* seems rather remarkable.

The Morphology of the Head of a "White Grub"

(with 37 text-figures)

by N. S. R. Malouf.

I. Introduction.

The writer is very indebted to Mons. A. Alfieri for preserved specimens and for valuable advice. Thanks are due to Dr. H. Priesner for spending half an hour for a talk on the subject. This small investigation is part of a course in insect morphology under the supervision of Prof. W. C. Mc Quiston of the American College of Arts and Sciences.

This work was greatly facilitated by the excellent apparatus and splendid library of the Société Royale Entomologique d'Egypte.

The abbreviations of the terms used are largely taken from those used by R. E. Snodgrass. The figures are those of the writer.

There are three common species of « white grub » coleoptera in Lower Egypt. The differences between the larvae have not been determined. They are extremely similar and take a long time to breed. However, the differences which may exist are undoubtedly superficial, and, to a morphologist, are not important. The real differences, on the contrary are anything but superficial, and lie concealed in cellular potentialities.

It is extremely probable, however, that the species here studied is *Pentodon dispar*. It may, however, be another species of *Pentodon*, or it may belong to the genus *Heteronychus*. That is unlikely.

II. The Epicranium.

The epicranium, or head-capsule, shows, in the main, primitive features.

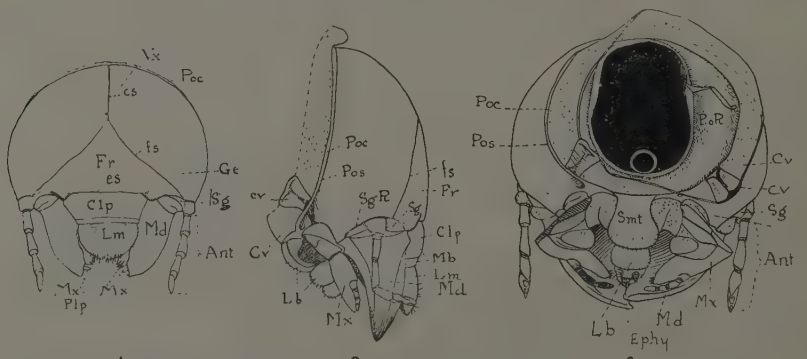


Fig. 1 : Anterior aspect of head. — Fig. 2 : Lateral aspect of head. — Fig. 3 : Posterior aspect of head.

When viewed anteriorly (fig.1) the lateral and dorsal parts appear spheroid in shape. The antennae are situated ventrally. When seen laterally (fig.2) the epicranium is seen to be compressed antero-posteriorly and to be a little telescoped into the thorax.

A. The Prostomium.

It is recognized that the frons, clypeus, and labrum are homologous with at least a large part of the annelid prostomium.

1. *Frons:* The frons is bounded on each side by a frontal suture (fig. 1, *fs*). The retractor muscles of the mouth angles arise on the lateral parts of the frons (fig. 34). The dorsal dilators of stomodeum arise mesally to the above retractors but lateral to origin of the retractors of the labrum. Finally, some bundles of the anterior adductors of the mandibles arise on the frons. The frontal sutures extend to the lateral parts of the subgenae, (fig. 1, *Sg*).

2. *Clypeus:* Probably in no insect is the clypeus movable upon the frons, and hence has no muscles inserted on it. In the grasshopper (*Schistocerca*

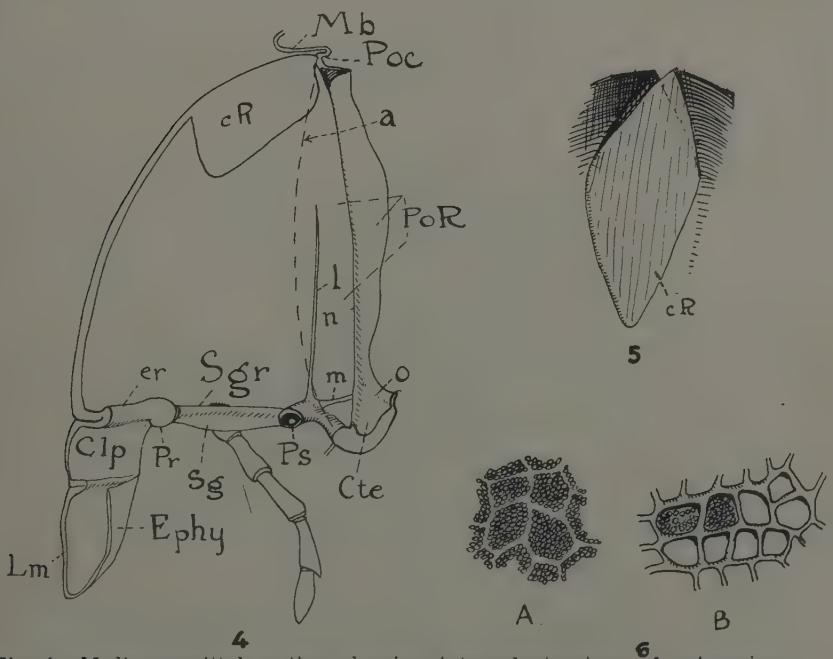


Fig. 4 : Median sagittal section showing internal structure of epicranium. — Fig. 5 : Coronal ridge. — Fig. 6 : A, shows cross-section of adductor muscles of mandibles; B, shows the ridges on the inner wall of the epicranium.

gregaria, for example) the clypeus is continuous with the subgena on each side.

The nature of the subgenal sclerites still remains a problem. It might seem that the solution lies in Crampton's paper (1928). However, no certainty can be based on that paper since it entirely ignores the internal structure of the epicranial wall and all deeling with musculature.

The clypeus is separated from the frons by the epistomal suture, *es*. Internally this suture is represented by a very strong ridge, the epistomal ridge (fig. 4, *er*). The epistomal ridge is continuous with the subgenal ridge, *Sgr*, and is enlarged at the lateral ends of the clypeus to form the precoila of each side. It is clear that the clypeus is a separate sclerite secondary to the formation of a ridge which offers resistance to the movements of the mandibles. Such also appears to be the case with the subgenae, namely, that each is detached from the gena of its side secondarily to the formation of the subgenal ridge.

The term « precoila » is adopted from A.D. Mac Gillivray (1923) even tho he apparently considers the typical anterior hinge of a mandible to be a mandibular condyle « articulating in this coila ». This is entirely unwarranted. Superficially it might appear (fig. 15) that the anterior hinges of the mandibles of the roaches, *Periplaneta americana*, and *Stylopyga orientalis* (*Blatta orientalis*) answer to Mac Gillivray's conception as indicated by his hypothetical figures (fig. 2; *A*,*B*).

On examining the cranial « acetabulum » of the roach, however (fig. 15, *Pr*) it will be seen that the concavity is well rounded and well adapted to the reception of the real acetabulum of the anterior mandibular hinge, namely, the socket of the mandible. The socket of the mandible is well adapted in shape to fit over the rounded surface of the cranial « acetabulum ». Functionally, therefore, the interior hinge of the roach mandible is a cranial condyle fitting into a mandibular acetabulum.

A hypothetical figure ought to represent what is functional and not what is superficially apparent. The hypothetical figure given by Snodgrass (1928, fig. 18) represents the correct conception. The anterior hinge in the grub is a decided cranial condyle in a mandibular acetabulum (fig. 10).

The ventral margin of the clypeus of our grub is membranous. This allows more freedom for the movement of the sensitized labrum. The membranous margin is not, however, the clypeo-labral suture (fig. 4).

The lateral parts of the clypeus are not quite bilaterally symmetrical (figs. 1 and 8).

3. *Labrum:* The labrum is a freely movable lobe of the prostomium. At its tip are numerous sensilla trichodea. The intima (its inner wall) forms the epipharynx (fig. 8). Laterally, on each side, the clypeo-labral ridge gives off a torma which is well sclerotized (fig 7). At the distal end of the

epipharynx are sclerotized prominences directed inward. A crescent-shaped sclerotization of the intima is present above each torma with a fringe of hairs on their mesal surfaces, directed mesally. Inclosed within the crescents are two sclerotized, tooth-like projections. There is a fringe of short, stiff bristles on each lateral edge of the labral epipharynx. These possibly aid in retaining food within masticatory quarters.

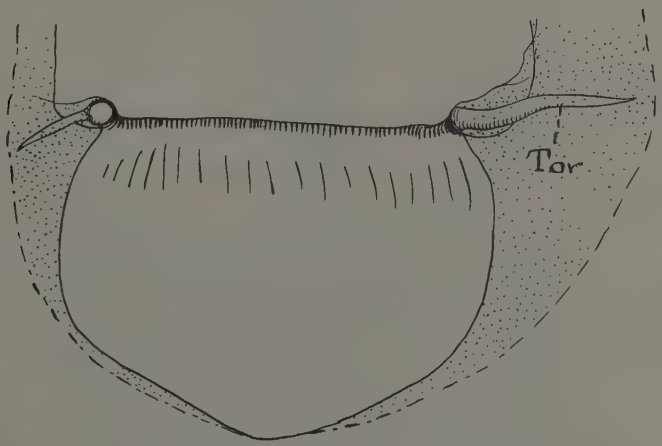


Fig. 7 : Posterior aspect of labrum with tormae spread out.

The retractor muscles of the epipharynx (fig. 8, *1*) insert on the clypeal epipharynx, just above the crescent shaped sclerotizations and mesal to them. They arise on the frons mesal to the dorsal dilators of the stomodeum.

The tormae bear no muscle attachments altho they are well developed. This indicates that the tormae are structures adapted primarly to aid in the retraction of the labrum. They hug the intima and thus concentrate the contraction of the retractor muscles upon the movement of the labrum. The crescent-shaped sclerites leading from the muscles to the tormae direct the force of contraction to the intima between th tips of the tormae.

It is significant to note that the position of the insertion of the retractors of the labrum is homologous to that of the dilators of the mouth cavity in the Homoptera. Yet Snodgrass (1927) uses that position of insertion (dorsal wall of the buccal cavity) to give evidence that the large fascial plate of the *Cicada* is a clypeus, because the dilators of the mouth cavity arise on that plate. What are probably the homologues of the Homopterous dilators of the buccal cavity arise on what is undoubtedly the frons, in our grub.

The many hairs on the labral epipharynx are directed mesally towards the median furrow.

B. The Genae, Postgenae, and Occiput.

The opposing genae and postgenae are bounded dorsally by the coronal suture (fig 1, *cs*). There is no suture separating the gena from the postgena of its side, but the area just preceding the postcoila and bounded posteriorly by the postoccipital suture should be considered as postgenal. Dorsally this

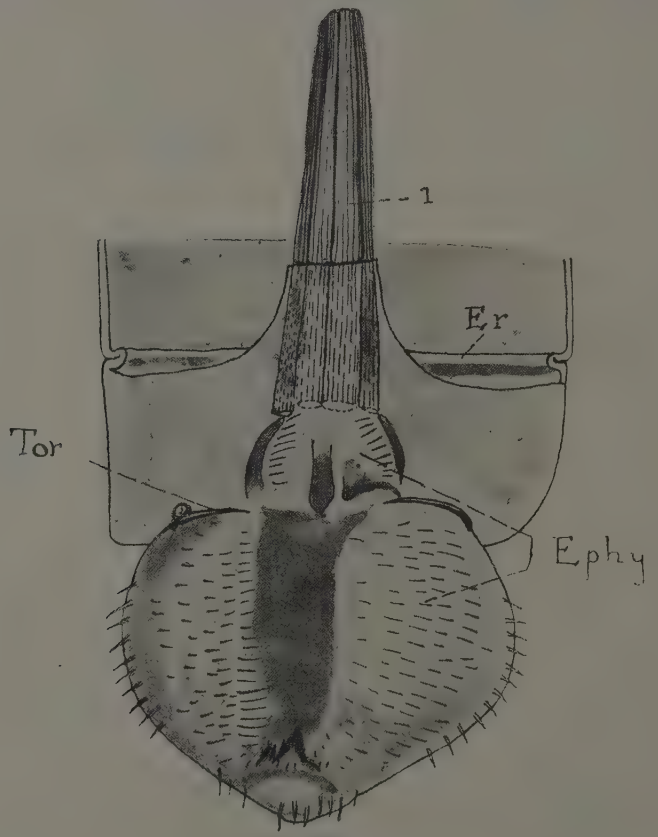


Fig. 8 : Epipharynx.

area would be termed the occiput, but there is no separation between vertex and occiput.

The subgenal sclerite extends between the pre- and postcoila of its side (fig. 4, *Sg*).

The coronal suture forms internally the coronal ridge (figs. 4, and 5, *cR*).

The ventral part of the coronal sutures forms no such inflection and is, like the frontal sutures, merely topographical.

The inner wall of the epicranium bears a network of ridges (fig. 6, *B*), which are externally apparent by depressions. These ridges mark the boundaries of the bundles of the strong adductor muscles of the mandibles (fig. 6, *A*). Within the larger ridges are smaller networks marking the boundaries of the muscle fibers. These ridges are not so apparent on the inner wall of the postoccipital ridge, altho on this ridge the adductors also arise.

C. The Postocciput and its Ridge.

The postoccipital sclerite is a narrow band, uninterrupted by the coronal suture. The postoccipital ridge, indicated externally by the postoccipital suture, is very wide, tho rather thin (figs. 3 and 4, *PoR*). It should be noted in connection that the subgenal ridge is continued as a ventral thickening of the corpotentorium (fig. 4, *Cte*). Thus, there is, in place of an internal tentorial bridgework, a ridge which totally circumscribes the head-capsule. In fig. 4 the internal boundary of the postoccipital ridge is shown by a broken line, *a*.

Dorsal to the postcoila arise two ridges on the inner wall of the postoccipital ridge (fig. 4, *l*,*m*). Ridge *m* meets the slanting ridge, *n*. There is a transverse elevation, *o*, which connects the opposite ridges, *n*. The part of the postoccipital ridge, mesal to ridge *n*, is directed posteriorly (fig. 3).

On the posterior wall of the postoccipital ridge, is a sinuous ridge (fig. 3) on which are inserted intrinsic muscles for the movement of the head (fig. 35, 25). All these ridges are adapted to strengthen the head-capsule for effective muscle contraction.

III. The Appendages.

A. The Antennae.

The antennae have four pseudosegments (fig. 1, *Ant*). The part of the epicranium to which the first pseudosegment is attached is swollen (figs. 1 and 2). Muscles are attached only to the base of the first segment (fig. 9, *2*, *3*, *4*). The muscles arise on the gena of their side. On two apodemes arising from the anterior half of the base of the first antennal segment are inserted, what are functionally, the promotors of the antenna, *2* and *3*.

On the apodeme of the opposite side of the base is inserted the remotor of the antenna, which is smaller than any. The significance of three basal antennal muscles is noteworthy. Has the scape fused with the pedicel ? Or,

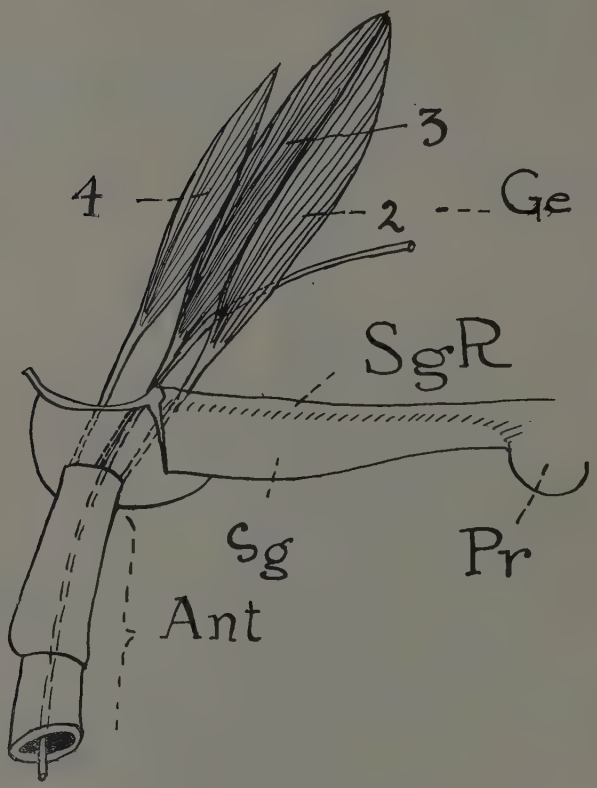


Fig. 9 : Antennal Muscles.

have the intra-antennal muscles been lost and one of the basal muscles become secondarily divided in two ?

B. The Mandibles.

The whole mandibular mechanism is well developed. Anteriorly the preartis (fig. 10, *Pra*) moves on the cranial precoila. Posteriorly the postartis, *Psa*, articulates in the postcoila. The hinges lie outside the membrane. The membrane joining the mandible to the epicranium (fig. 1) and to the hypopharyngeal rods (fig. 17, *HS*) is ample, thus allowing free articulation of the mandibles.

The abductor apodeme of the mandible is flattened anteroposteriorly and lies, as does the adductor apodeme, within the perimandibular membrane

(figs. 10 and 12, *Ap.*, Ap^1). The abductor muscles of the mandibles arise on the geno-postgenal region of their side (fig. 11, *5*). When seen laterally and internally, fig. 11, the apodeme appears like the midrib of a palm-leaf with the muscles fibres like leaflets portruding from it. When viewed posteriorly (or anteriorly), fig. 12, it will be seen that the abductor fishers do not

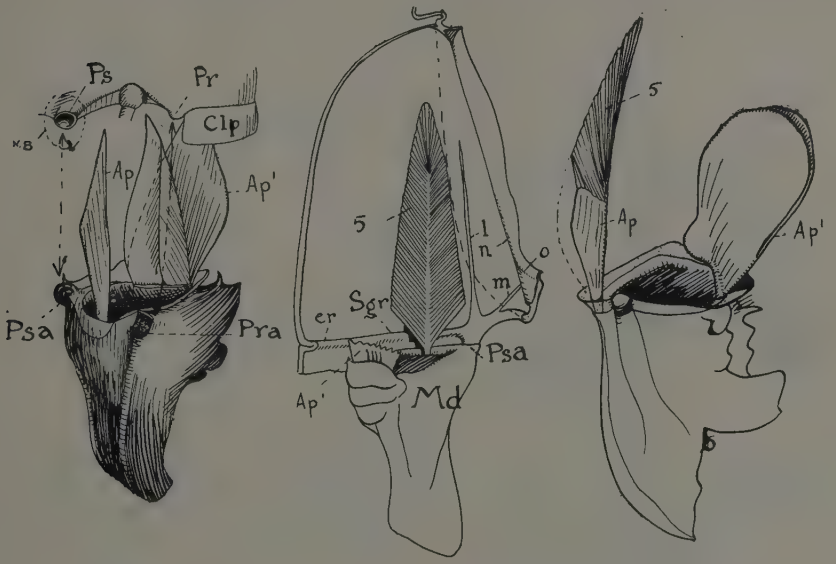


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Fig. 10 : Antero-lateral aspect of right mandible and epicranium. — Fig. 11 : Sagittal section to the right of the median line showing abductor muscle of the right mandible and its relation to the epicranium.—Fig. 12 : Left mandible, posterior aspect, showing apodeme and abductor muscle.

insert on the apodeme in single file, as the leaflets of a palm-tree are arranged on the midrib, but are attached on the whole of the flattened structure. The broken line shows where the muscle fibers extend.

The adductor apodeme, Ap^1, appears double and leaf-like. Both « leaves » however are joined basally at their posterior ends (fig. 12). Upon posterior « leaf » insert the posterior bundles of the adductor muscles which arise on the postoccipital ridge and parietals (figs. 34 and 36, *6a*). Upon the mesal surface of the anterior leaf insert the anterior bundles of the adductors which arise on the frons, genae, and coronal suture (fig. 34, *6*).

The posterior inflection of the postoccipital ridge, mentioned previously as being bounded by ridge n (fig. 4) does not bare attachments of the posterior adductors (figs. 34 and 36).

When in adduction the left mandible which is slightly longer than the

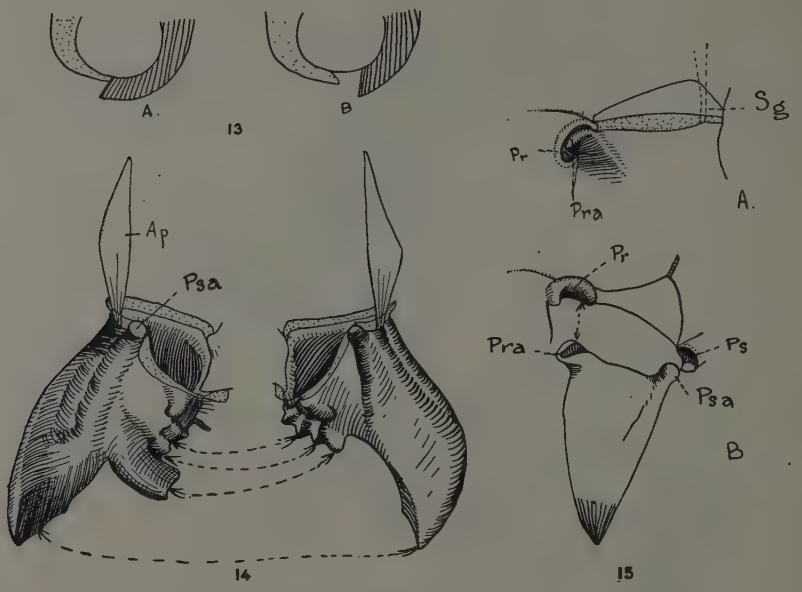


Fig. 13 : A, mandibles in complete adduction; B, mandibles partly adducted. — Fig. 14 : Mandibles in abduction, posterior aspect. — Fig. 15 : A, Anterior mandibular hinge of roach mandible; B, Left mandible and epicranium of roach to show articular surfaces.

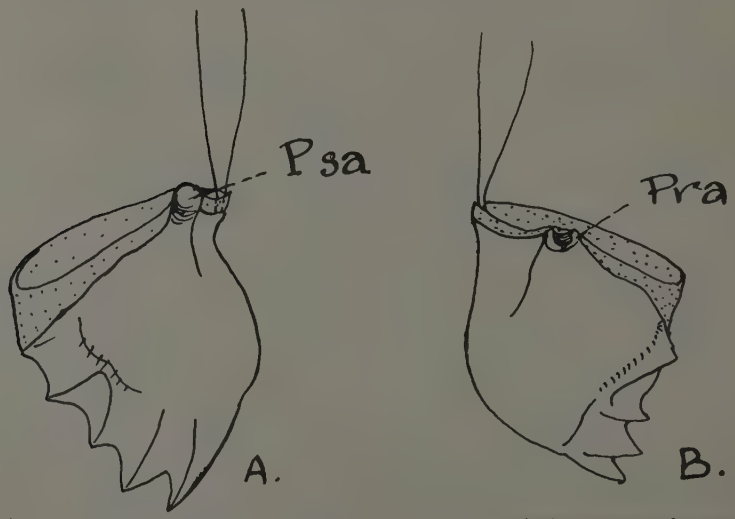


Fig. 16 : A, Posterior aspect of roach mandible; B, Anterior aspect of same.

right is situated over the right (fig. 13, *A.B*). Fig. 14 shows the molar areas of the mandibles to be complementary. The ridges of the right mandible situate in the furrows of the left mandible during adduction. The molar areas are very efficient crushing machines.

There is at the dorsal mesal end of each mandible a tuft of hairs.

C. The Maxillae.

When viewed anteriorly (fig. 17, *A*) the maxilla is seen to consist of a mesal sclerite, *w*; of a lateral sclerite, *Cd*; and of a distal, hollow, conical structure which bears the four-segmented palpus. It will be shown, by the musculature, that the mesal sclerite is merely a secondary sclerotization of the membrane, that the lateral sclerite is the cardo, and finally, that the distal conical structure which is hinged on the cardo and which bears the palpus is the fused stipes and lacinia.

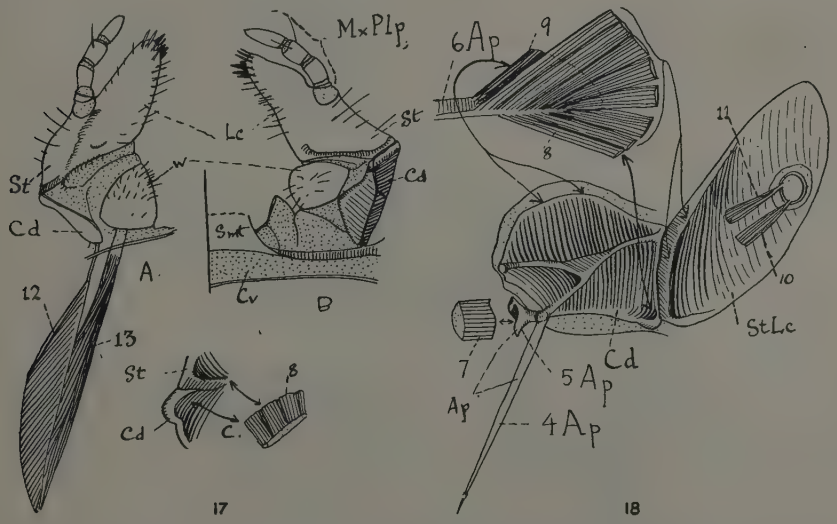


Fig. 17 : A, Anterior aspect of left maxilla; B, Posterior aspect of same. — Fig. 18 : Ental aspect of maxilla showing muscular attachments.

Fig. 20 shows that the distal, conical structure has a flexor muscle, *13*, which arises on the inner wall of the postoccipital ridge, inserting on its mesal border. This muscle is undoubtedly homologous with the cranial flexor of the lacinia of insects having a separately functional lacinia, and, therefore, marks the region of its insertion as the lacinia.

This muscle arises close against a flat muscle, *12*, which inserts on a

tendon of the cardo (figs. 20, 18, *4 Ap*). This is the promotor of the lateral sclerite and designates the sclerite of its insertion as the cardo.

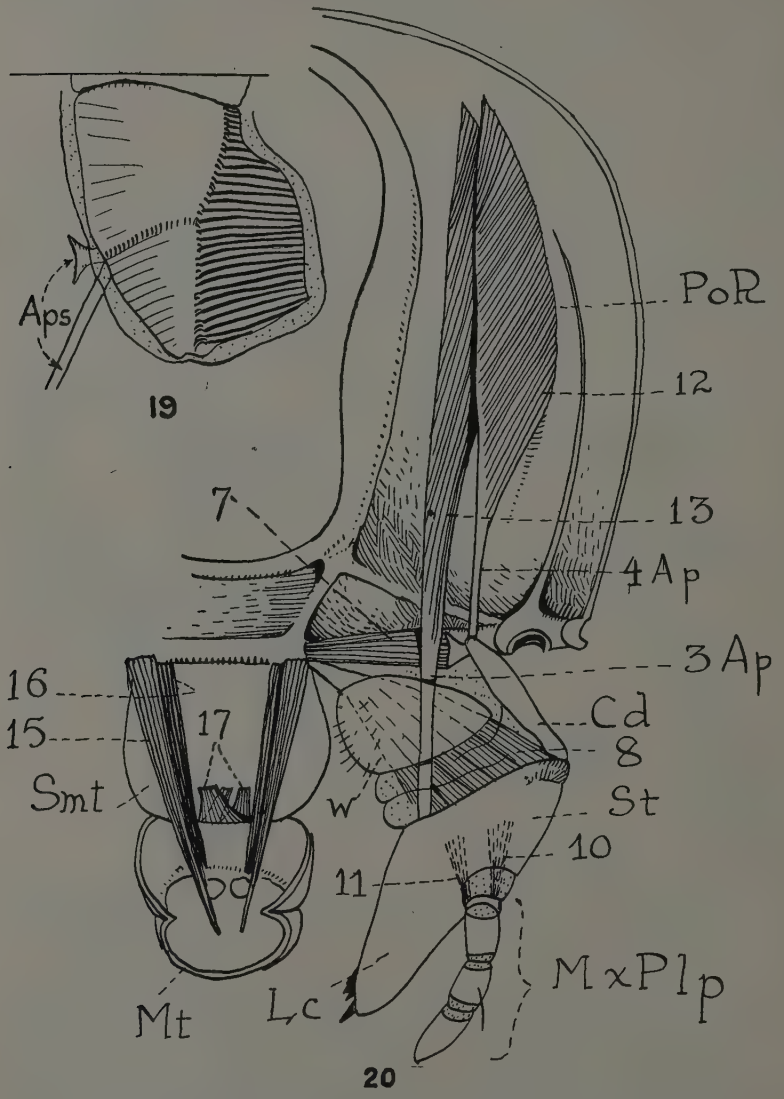


Fig. 19 : Extal aspect of cardo. — Fig. 20 : Anterior aspect of left maxilla, labium and postoccipital ridge.

A band of fan-shaped muscles (figs. 18 and 20, 8) arising on a common tendon (fig. 18, *6 Ap*) and inserting on the shelf at the base of the stipes just above the line of articulation of the cardo and stipes act as the adductors of the stipes. Some fibers insert on a distal corner of the cardo as indicated by an arrow in fig. 18, and hence must act as adductors of the cardo (see also fig. 17, *C*).

A thin, fan-shaped muscle (fig. 18, *9*) also arising on apodeme 6 but situated at right angles to the rest inserts on the posterior border of the cardo as indicated by arrows. It acts as adductor of the cardo.

The insertions of the muscle bundles arising on apodeme 6 have been shown by arrows rather than by direct superposition because of the impossibility of figuring them thus due to the fact that the stipes-lacinia is flexed when muscles 8 remain inserted.

Another adductor of the cardo (figs. 18, 20, *7*) arises on the corpotentorium near where apodeme 6 arises. It inserts on a short apodeme (fig. 18, *5 Ap*) adapted to the shape of the muscle bundle. The adductors of the coxa must necessarily also adduct the stipes-lacinia.

The region where the palpus arises must be the stipes. The palpus has adductor and abductor muscles inserting on the first ring-like segment and originating on the stipes (figs. 18, 20, *11*, *10* respectively).

Altho the lacinia has lost its hardened nature and has become fused with the stipes it neverthless possesses four strongly sclerotized teeth at its distal tip (figs. 17 and 20). The cause for the sclerotizaion of the membrane in the formation of sclerite *w* (figs. 17 and 20) is apparently to protect the adductor muscles during mastication.

The left maxilla is slightly longer and larger than the right maxilla, and so, when in adduction the tip of the left lacinia overlaps that of the right. This is accessory to the mandibular mechanism mentioned previously.

The cardo when seen entally (fig. 18, *Cd*) shows a strong framework of ridges. Since these bear no muscle attachments they are present to form a strong support, giving resistance to the flexor and adductor mechanism of the maxilla.

It is not clear how the cardo and stipes-lacinia revert to their original positions after the flexor and adductor muscles have contracted. Such is the case, however, not only with the maxillary mechanism of the grub but with the maxillary mechanism of insects with a more or less generalized maxilla.

The maxilla articulates on a small knob portruding from a mesal extension of the epicranium (figs. 3 and 17). There is no knob-socket articulation, however, since the knob and socket is rudimentary and lie in direct line with the membrane.

D. The Labium.

The submentum (fig. 3, *Smt*) is attached on each side to the mesal extensions of the epicranium.

The mentum (figs. 21 and 22) bears the palpi which are two-joined, the first joint being ring-like. There is a sclerite in between the submentum and the mentum the morphological nature of which remains in doubt. It is attached to the hypopharynx (fig. 21) and is not free like the submentum. It is a sclerite which has probably become secondarily detached from the mentum due to the formation of an internal ridge for the attachment of

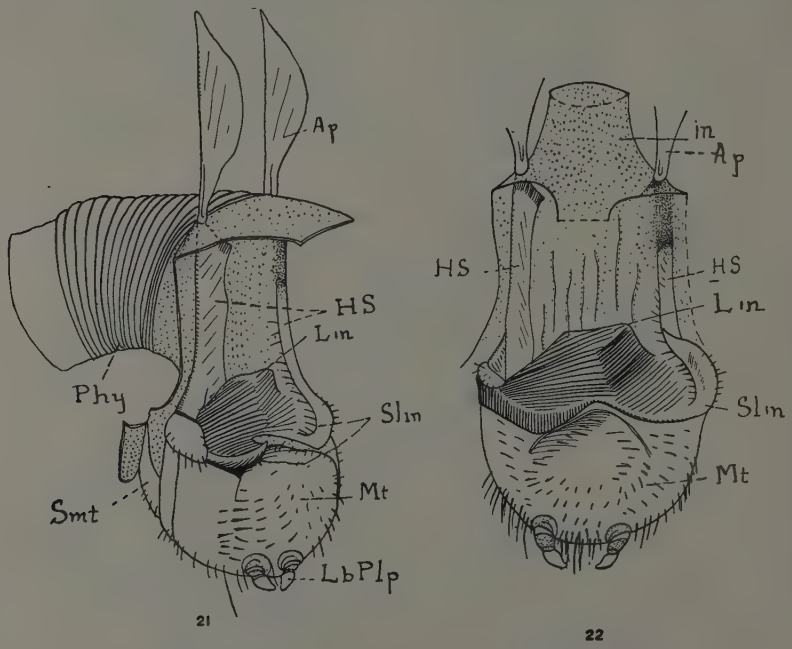


Fig. 21 : Labium and hypopharynx antero-lateral aspect. — Fig. 22 : Mentum and hypopharynx (Ventro-anterior aspect).

the proximal retractors of the mentum (fig. 20, *16*). The formation of functional sclerites is quite in accord with modern conceptions of the insect skeleton. As Riley (1904) points out : « Sclerites originate from mechanical causes and do not necessarily have any relation to the primary segmentation ».

The distal retractors of the mentum (fig. 20, *15*) insert at the apex of the mentum anterior to the labial palpi. They tend to invaginate the mentum, extensive infolding being prevented by the hypopharynx. Both retractors arise on the corpotentorium (fig. 20). Attached to the inflection between the

submentum and mentum are short muscle bundles, *17*. Due to lack of specimens the other attachment of these bundles was not be determined.

The *Hypopharynx:* Situated on the membrane posterior to the mentum is the hypopharynx. It is not bilaterally symmetrical. The left superlingua is not as sclerotized as the right (fig. 22, *Slin*). It bears hairs and gives off the left suspensorial plate (*HS*) dorso-anteriorly. The left suspensorial plate merges imperceptibly on either side into the intima of the buccal cavity. The right suspensorial plate (figs. 21 and 22) is more pronounced. The intima of the buccal cavity appears to be pierced through by the suspensorial plates which then become the apophyses upon which are inserted the retractor muscles of the mouth angles (fig. 34, *4*). This however, is unlikely ; and, as Snodgrass very often points out, the cuticle of an insect is continuous and not broken. It is only ruptured secondarily where the mesenteron meets the stomodeum and proctodeum and where the mesodermal parts of the sexual organs meet the ectodermal parts.

The apophyses of the mouth angles are, therefore, probably evaginations of the intima of the mouth cavity. This does not mean, however, that the suspensorial plates have not entered the lumen formed by the evagination.

The retractor muscles of the mouth angles arise on the frons (fig. 34,*4*) lateral to the retractors of the epipharynx, *1*. They insert on either side of the apophyses of the mouth angles. Their action is to dilate the lateral parts of the buccal cavity as well as to draw the pharynx forward. The mesal part of the perimandibular membrane is that which is attached to the suspensorial rods of the hypopharynx (figs. 21 and 34).

IV. The Stomodeum.

The musculature around the intima commences posterior to the apophyses of the mouth angles (figs. 21, 23, and 24). The pharynx merges imperceptibly

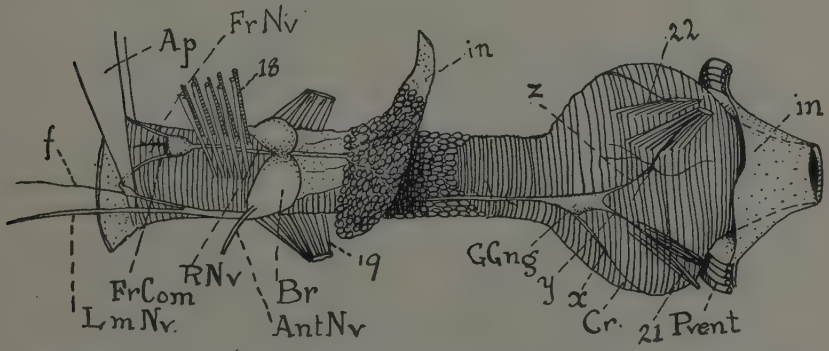


Fig. 23 : Dorsal lateral aspect of stomodeum and adjoining structures.

into the esophagus, but it should be the large anterior part of the stomodeum (fig. 34, *Phy*).

The dorsal dilators of the stomodeum (figs. 23 and 34, *18*) insert on either side of the recurrent nerve (fig. 23, *RNv*). They arise on the frons lateral to the retractors of the labrum (fig. 34). .

The lateral dilators of the stomodeum (figs. 23 and 34, *19*) arise on the corpotentorium and insert laterally on the esophagus. Abduction of the mandibles widens the mouth cavity and tends to bring the whole stomodeum forward including the brain and adjoining structures. Hence the lateral dilators of the stomodeum must offer resistance to what appears to be a disconcerting circumstance. Double dilation mechanism is the result — mandibular abduction and the contraction of the lateral dilators of the stomodeum.

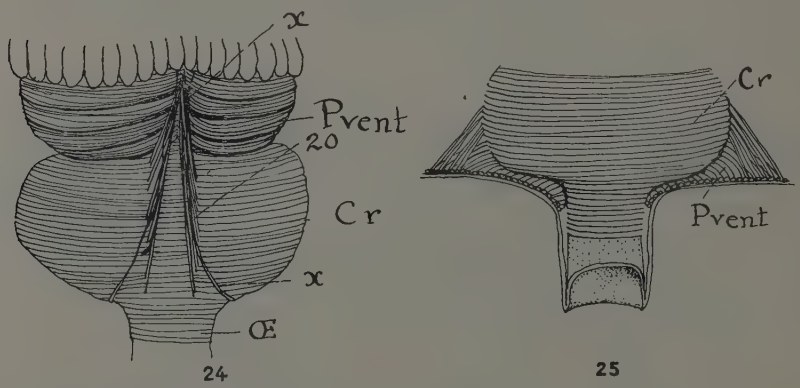
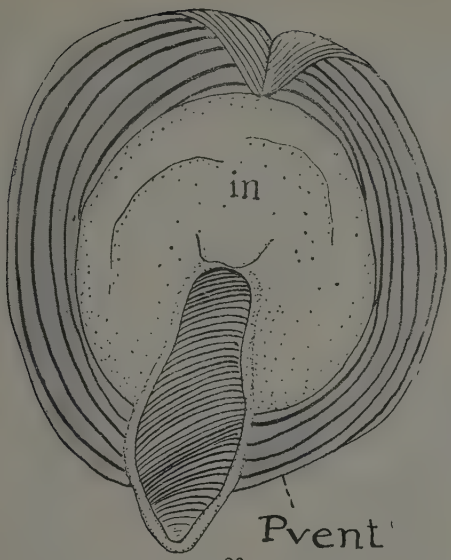


Fig. 24 : Ventral aspect of crop and proventriculus. — Fig. 25 : Crop with the sectioned proventriculus.

Posterior to the head the esophagus enlargens into the crop which may be found in dilation or contraction. The intima continues posterior to the crop with no muscle coating and then reverts anteriorly again with no muscle coating (figs. 23 and 25). It continues transversely with a thick layer of circular muscles and now constitutes the proventriculus.

Muscles *20*, *21* and *22* (figs. 23, 24, 25, 26 and 34) are attached from the crop to the proventriculus. The lateral pairs, *21*, are not attached to depressions of the proventriculus. The dorsal and ventral pairs (*22* and *20* respectively) are however attached in depressions in the proventriculus (figs. 24 and 27). The crop bears no such pronounced depressions. The action of these muscles is to draw the proventriculus anteriorly and the crop walls posteriorly, culminating in the posterior progression of the funnel-shaped invaginated intima and the emptying of food from the crop into the ventriculus,



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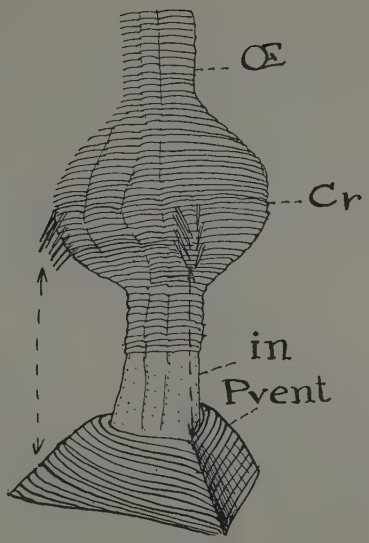

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Fig. 26 : Infolding; posterior aspect. — Fig. 27 : The forcible evagination of the infolding.

Fig. 28 : Cross-section of esophagus.

An attempt was made to evaginate the intimal funnel with, the result that the compressor muscles were detached from one of their attachments (fig.27).

Cross-sections of esophagus (fig. 28) shows the epithelium to have six large longitudinal infoldings which increase surface for absorption. The cuticular intima, *in*, is lose and wrinkled tho it, in the main, follows the inflections of the epithelium. It bears no hair or spines. Next to the epithelium are the longitudinal muscles surrounded by the circular fibers.

Fig. 29 shows a certain region of the esophagus.

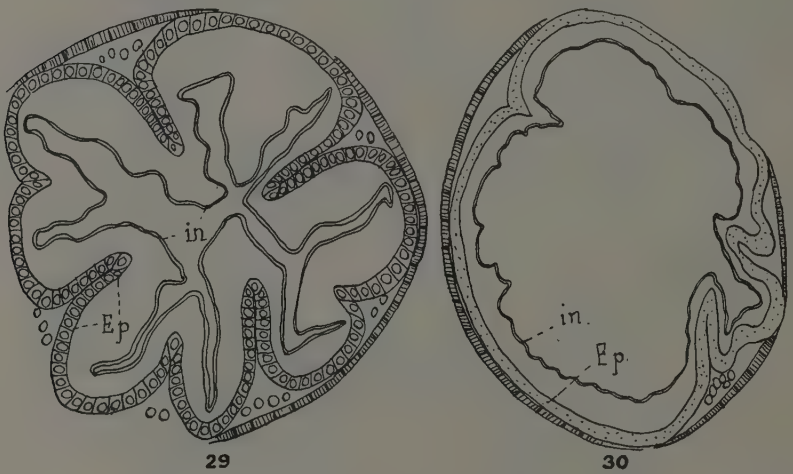

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Fig. 29 : Cross-section of esophagus in another region. —
Fig. 30 : Cross-section of pharynx.

A cross-section of the pharynx, fig. 30, shows the latter to have few epithelial infoldings and very scant longitudinal muscle fibers. The walls are in certain parts quite wrinkled tho, to afford capacity for dilation with excess food.

The esophagus is 0.5 m/m in diameter. The crop is about 1.2 m/m when not dilated with food.

V. The Nervous System.

A conspicuous feature is that, due to absence of eyes, the brain lacks optic lobes. The more dorsal nerve issuring from the brain (figs. 23 and 34, *AntNv*) goes to the antenna. The nerve ventral to the antennal nerve is the labrofrontal nerve which gives its main branch to the clypeus and labrum (figs. 31 and 34, *LbFrNv*). This main branch is the labral nerve, *LmNv*. The other branch, the frontal commissure, *FrCom*, turns posteriorly to join the

frontal ganglion after giving off a small branch of its own, *f*, to the retractor muscles of the labrum. This small branch arises from what appears to be a small swelling of the frontal commissure at the base of the apophysis of

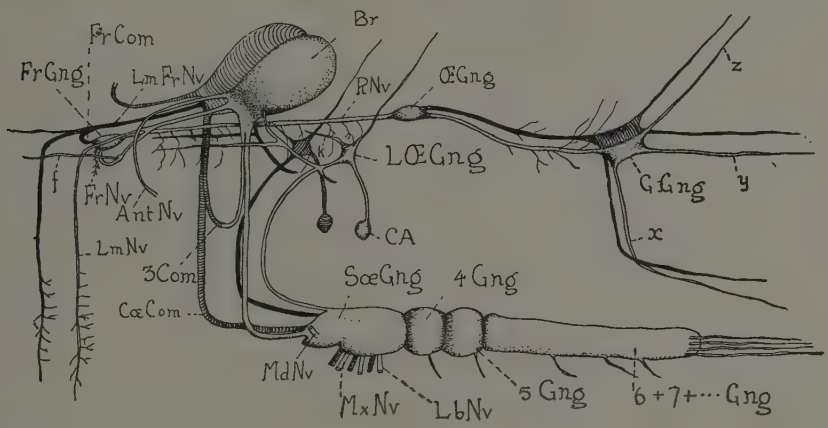

Fig. 31 : Lateral aspect of anterior part of nervous system.

the mouth angle of its side (figs. 23, 31, and 34). The frontal commissure, it is seen, turns round the base of the retractor apophysis of the mouth angle to join the frontal ganglion.

The frontal ganglion gives off anteriorly a small frontal nerve, *FrNv* (figs. 23 and 31) which follows the downward bend of the pharynx. Posteriorly it gives issue to the recurrent nerve, *RNv*, which gives off smaller transverse branches encircling the esophagus, and which joins the esophageal ganglion, *ŒGng*. The esophageal ganglion is situated dorso-medially on the esophagus concealed by what are probably lipoid cells (fig. 23). It gives rise to a pair of dorso-lateral nerves each of which joins the gastric ganglion of its side. Each gastric ganglion *GGng*, gives rise to three main nerves (figs. 23, 24, 31 and 34, *x*, *y*, *z*) which stimulate the dorsal, lateral and ventral compressors of the crop and proventriculus.

The lateral esophageal ganglion of each side, *LŒGng*, (figs. 31 and 34) is not connected with the esophageal (hypocerebral) ganglion as is the usual case. It gives off an oblique dorsal branch to what are probably lipoid cells. Ventrally, it gives off a branch to stimulate the corpus allatum, *CA*, of its side. Anteriorly it gives rise to a branch which splits into two, the ventral one curling anterior to the corpotentorium and joining the subesophageal ganglion, *SoeGng*. The lateral branch gives off a small dorsal branch to the ventral part of the brain and a longitudinal branch to innervate the esophagus. .A small branch, *K*, is also given off anteriorly to innervate a flat body attached to the ventral part of the brain (figs. 31 and 34).

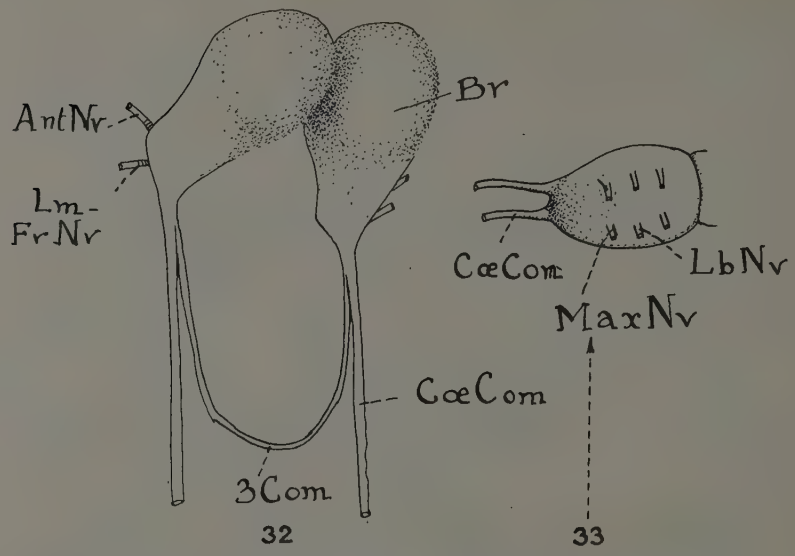

Fig. 32 : Posterior aspect of brain. — Fig. 33 : Latero-ventral aspect of subesophageal ganglion.

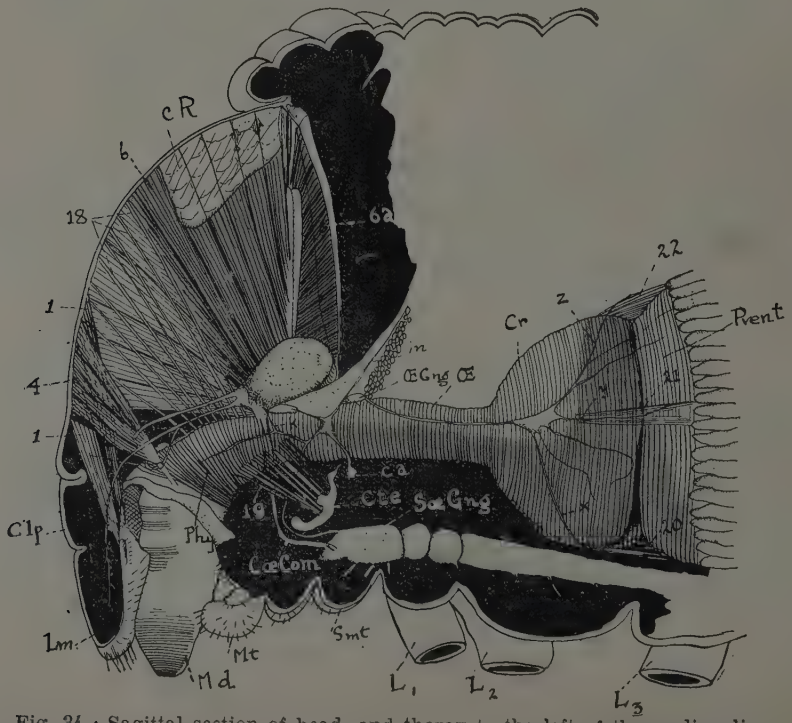

Fig. 34 : Sagittal section of head, and thorax to the left of the median line.

The tritocerebral commissure (fig. 31, *3 Com*) joins the opposite tritocerebra. Due to the fact that it is extra-cerebral Snodgrass (1926) points out that the tritocerebral lobes are fused with the brain after the stomodeal invagination. In the same paper Snodgrass further gives four excellent reasons for rejecting Janet's theory (1899) which states that the stomatogastric ganglia belong to pre-cerebral segments.

The subesophageal ganglion lies below the corpotentorium. Besides giving rise to mandibular, maxillary, and labial nerves it gives issue to another nerve posterior to the labial nerve. The writer has not traced this nerve to the tissues it innervates.

The first thoracic ganglion, *4Gng*, closely followed by the second , *5Gng*, is closely attached to the subesophageal ganglion. The third thoracic ganglion is compound and has many nerves issuing from its posterior end.

VI. The Motion of the Head as a Whole.

There is a single large cervical sclerite which articulates posteriorly on the first thoracic tergum and anteriorly on the postocciput (figs. 2 and 3, *cv*). Stocky muscle bundles are inserted on its inner border in two sets — a set

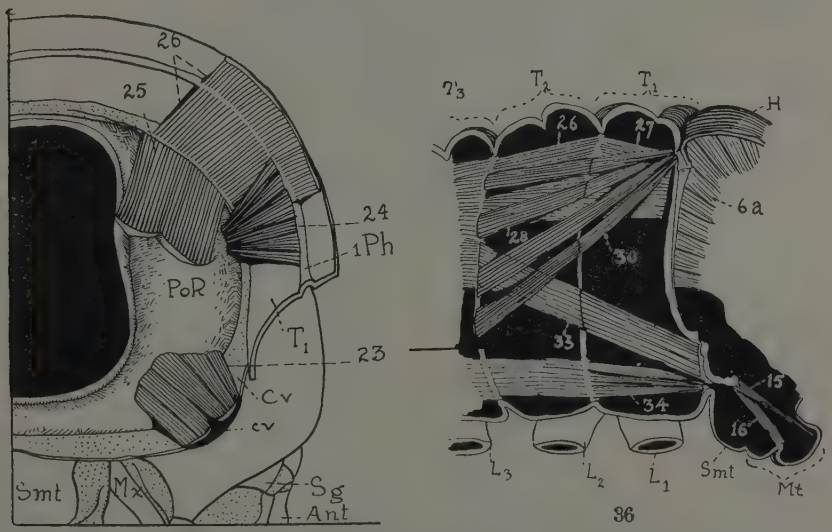

Fig. 35 : Right half of posterior aspect of head. — Fig. 36 : Median sagittal section through thorax showing muscles for head movement.

on either side of the median ridge of the sclerite (fig. 35, *23*). These muscles arise on the posterior wall of the postoccipital ridge, *PoR*. If both sides act in unison the result is retraction of the lower side of the head. Muscles *25*,

fig. 35, arise on the sinous ridge and insert on an infolding of the neck membrane. Their action is to retract the upper half of the head posteriorly and ventrally. Muscles *24*, insert on the postoccipital ridge and arise on the first thoracic phragma. There action would be to telescope the head into the thorax. Muscles *26*, are the regular dorso-lateral longitudinal muscles of the body. The most anterior band insert on the same infolding of the neck membrane as muscles *25* do. Their action is the opposite to the telescoping of the head.

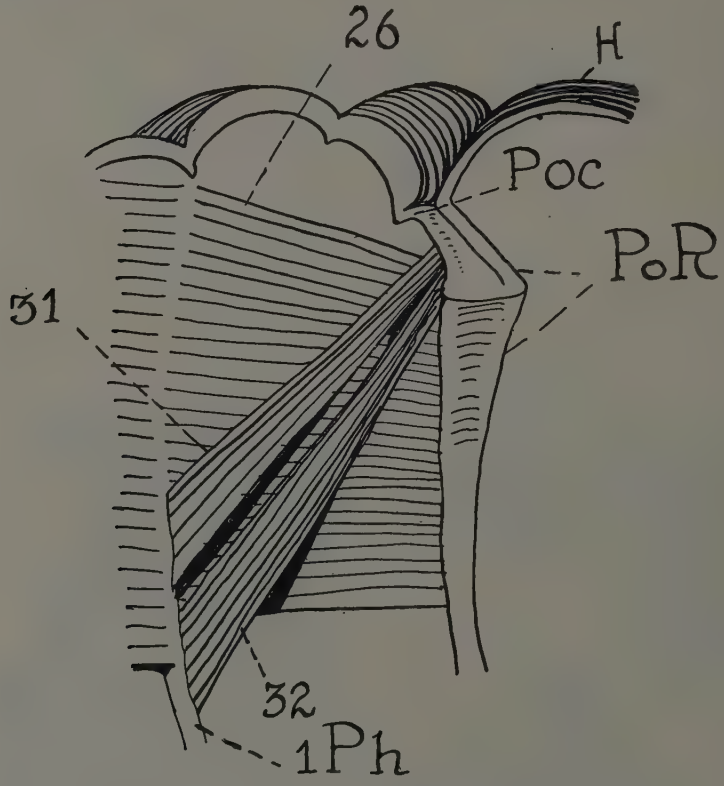

Fig. 37 : Sagittal section; showing more lateral muscles for head movement.

Fig. 36 shows a median sagittal section through the posterior part of the head and thorax. Muscles *27*, *28*, *29* and *30* arise on the second thoracic phragma. Muscles *27*, *28* and *29* insert on the postocciput. Muscle *30* inserts on the postoccipital ridge. The action of the whole is to telescope the dorsal part of the head into the thorax and thus draw the mouth parts forward.

Muscle *33* also originates on the second thoracic phragma but runs obliquely downward, lateral to muscles *29* and *30* to insert on the corpotentorium. The action is to draw the lower part of the head posteriorly, and is thus antagonistic to : muscles *25*, *27*, *28*, *29*, *30*, *31*, *32* and *24* but reinforcing muscles *23* and *34*. Some of the ventral set of longitudinal segmental muscles insert on the submentum (*Smt*). Lateral to muscles *29* and *30* are muscles *31* and *32* which originate on the first thoracic phragma and insert on the postoccipital ridge. Their action is to telescope the dorsal part of the head into the thorax and thus draw the mouth-parts forward.

At the region of the first thoracic phragma it should be noted that muscles *27*, *28*, *30*, and *33* are broken by bands of connective tissue. The fact that muscles *31* and *32* do not have this, and that the lines of thin connective tissue are above the first thoracic phragma, indicates that these muscles for head movement were originally segmental and have become united to afford greater mechanical force for the specific head movements.

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ABBREVIATIONS OF TERMS USED.

Ant, antenna.
Ant Nv, antennal nerve.
Ap, apodeme.
Aps, apodemes.
Br, brain.
C, ceca.
CA, corpus allatum. .
Cd, cardo.
Clp, clypeus.
CoeCom, circumesophageal commissure.
3COm, tritocerebral commissure.
Cr, crop.
cR, coronal ridge.
Cte, corpotentorium.
Cv, cervix.
cv, cervical sclerite.
Ep, epithelium.
Ephy, epipharynx.
er, epistomal ridge.
es, epistomal suture.
Fr, frons
FrCom, frontal commissure.
FrGng, frontal ganglion.
FrNv, frontal nerve. .
fs, frontal suture.
Ge, gena.
GGng, gastric ganglion.
Gng, ganglion.
H, head.
HS, suspensorial plate of hypopharynx
in, intima.
L, leg.
Lb, labium.
LbPlp, labial palpus.
LbNv, labial nerve.
Lc, lacinia.
Lm, labrum.
LmFrNv, labro-frontal nerve.
LmNv, labral nerve.
Lin, lingua.
LŒGng, lateral esophageal ganglion.
Mb, membrane.
Md, mandible.
MdNv, mandibular nerve.
Mt, mentum.
Mx, maxilla.
MxNv, maxillary nerve.
MxPlp, maxillary palpus.
Œ, esophagus.
Ph, phragma.
Phy, pharynx.
Poc, postocciput.
PoR, postoccipital ridge.
Pos, postoccipital suture.
Pr, precoila.
Pra, preartis.
Ps, postcoila.
Psa, postartis.
Psa, postartis.
Pvent, preventriculus.
RNv, recurrent nerve.
Sg, subgena.
SgR, subgenal ridge.
SLing, superlingua.
Smt, submentum.
SœGng, subesophageal ganglion..
St, stipes.
StLc, stipes-lacinia.
T, thorax.
Tor, torma.
Vx, vertex.
w, secondary sclerotization of maxillary membrane.

Séance du 24 Mai 1932

Présidence de S.E. le Dr. Mohamed Shahine Pacha, *Président.*

Dons d'ouvrages :

La Société a reçu pour sa Bibliothèque les publications qui suivent :

1° De l'Administration des Biens Privés et des Palais Royaux : un exemplaire du premier volume de l' « *Histoire de la Nation Egyptienne* », par Gabriel Hanotaux, publié sous les auspices de S.M. le Roi Fouad 1er.

2° De Monsieur André Théry, de Rabat (Maroc) : neuf tirés à part de ses travaux sur les Buprestides.

3° De l'Union des Agriculteurs d'Egypte : un exemplaire du Rapport No. 59 du Département d'Agriculture de Formose ; deux tirés à part, traitant des Aleurodides, extraits des Transactions of the Natural History Society de Formose ; trois tirés à part, traitant des Aleurodides, extraits du Journal of the Society of Tropical Agriculture de Formose.

Le Conseil remercie les généreux donateurs.

Contribution aux Collections d'Ornithologie :

L'Administration des Biens Privés et des Palais Royaux a fait parvenir un exemplaire naturalisé de *Nycticorax griseus* Linné (Héron bihoreau ; arabe : Waqr).

Le Conseil remercie.

Appel de S.E. le Ministre de l'Agriculture :

Faisant suite à cet appel, le Conseil décide de disposer, en faveur de la Bibliothèque du Musée Agricole Fouad 1er, d'un lot composé de 517 ouvrages et brochures entomologiques qui font double emploi sur les rayons de la Bibliothèque de la Société.

Conférence :

Dans la salle des Conférences de la Société, sous les auspices du Ministère d'Agriculture et en présence de S.E. le Ministre de l'Agriculture, Monsieur le Docteur Mamoun Abdel Salem a fait une conférence, en anglais,

accompagnée de nombreuses projections, sur « *La nature des maladies des Plantes* ». — Le conférencier a été chaudement applaudi.

Echange des Publications :

Se fait inscrire la General Library, University of Michigan, Ann Arbor, Michigan, U.S.A.

Nomination :

Monsieur Edouard Gantès, du Caire, est élu membre titulaire, proposé par Messieurs H. C. Efflatoun Bey et A. Alfieri.

Communications

Les Thysanoures d'Egypte et le cycle évolutif de *Thermobia aegyptiaca* Eschrch.

par Anastase Alfieri.

Ces insectes appartiennent à l'ordre le plus inférieur de la classe des hexapodes et sont représentés, en Egypte, par les espèces ci-dessous :

1. *Lepisma wasmanni* Moniez. — Désert libyque aux abords des Pyramides de Ghizeh, sous pierres, en compagnie de fourmis (*Messor* (*Aphaenogaster*) *barbarus* L.) ; désert arabique aux environs du Caire, sous pierres, en compagnie de fourmis (*Messor* (*Aphaenogaster*) *barbarus* L., *Messor* (*Aphaenogaster*) *barbarus meridionalis* var. *mediorubra*, *Myrmecocystus viaticus* var. *desertorum*).
2. *Lepisma aurisetosa* Wahlgren. — Décrite d'Egypte d'après des exemplaires recueillis à Hélouan sous les pierres.
3. *Lepisma saccharina* L. — L'habitat égyptien de cette espèce cosmopolite n'est pas confirmé, mais il est très probable qu'elle existe dans le pays.
4. *Ctenolepisma targionii* Grassi-Rov. — Recoltée à Hélouan sous les pierres.
5. *Ctenolepisma michaëlseni* Eschrch. — Tourah (désert), sous les pierres.

6. *Ctenolepisma lineata* var. *pilifera* Lucas. — Récoltée à Abou-Simbel (Haute-Egypte).

7. *Thermobia aegyptiaca Luc.* — C'est l'espèce égyptienne la plus répandue, notamment dans les habitations.

8. *Thermobia cincta* Wahlgren. — Décrite d'Egypte d'après des exemplaires recueillis aux abords des Pyramides de Ghizeh sous les pierres.

Quelques-unes des espèces précitées sont myrmécophiles, une autre, *Thermobia aegyptiaca* Luc., espèce domestique, fait le désespoir des ménagères, bibliothécaires, etc. On la trouve communément dans les appartements où elle se cache derrière les tableaux, meubles, coins sombres, n'apparaissant que la nuit pour commencer ses déprédations. Elle va à la recherche de tout objet comportant des matières amylacées ou des substances ayant une saveur sucrée (colle des reliures d'ouvrages, couche des photographies, etc.) dont elle se nourrit. C'est dans ces conditions que je recueillis, le 15 Juin 1929, treize exemplaires de *Thermobia aegyptiaca* Luc. destinés à l'élevage. Les résultats de mes observations méritent d'être publiés ici, car ils établissent, dans une certaine mesure, le cycle évolutif de cet insecte, au moins en ce qui concerne son développement sous le ciel d'Egypte.

Entre le 9 et le 12 Juillet, mes captifs avaient pondu 25 œufs dans le bocal dans lequel je les avais enfermés. Le 6 Août j'obtins 7 éclosions et deux jours après ce chiffre s'élevait à 17. Il n'y eut plus d'autres pontes, ni d'autres éclosions. La mort des parents commença le 30 Septembre et les derniers survivants succombèrent le 26 Octobre, soit avec une moyenne minimum de 80 jours, maximum de 106 jours de l'époque des pontes.

Des 17 éclosions obtenues entre les 6 et 8 Août, seulement onze individus survécurent jusqu'après la sixième mue. Celle-ci constituait, apparemment, l'état adulte. Elle eut lieu entre le 11 et le 16 Décembre respectivement.

La longueur moyenne des exemplaires, mesurée à différentes époques de leur évolution, queues non comprises, était la suivante : 0.0051 au 25 Octobre 1929, 0.0054 au 15 Décembre 1929, 0.0056 au 15 Février 1930, 0.0059 au 19 Mars 1930, 0.0061 au 22 Mai 1930, 0.0065 au 21 Juillet 1930, 0.0074 au 8 Septembre 1930, 0.0078 au 8 Octobre 1930, 0.0080 au 16 Novembre 1930, 0.0082 au 15 Décembre 1930 date de la mort des derniers exemplaires (1). L'étude de ces chiffres indique que la période de grande activité a lieu entre le 21 Juillet et le 8 Septembre, c'est-à-dire l'époque la plus chaude et la plus humide de l'année. Quant au cycle évolutif complet de l'insecte il nécessite 18 mois de temps.

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(1) Il est à noter que la longueur des adultes en liberté peut atteindre jusqu'à 12 millimètres et même un peu d'avantage.

The "Masked Scale" *(Chrysomphalus personatus)*, in Egypt

(with Plate II (figs 1 - 3) and Text-Figures 4 - 6)

by Prof. Dr. H. Priesner and Mahmoud Hosny, D.I.C., F.E.S.

Chrysomphalus personatus (*Mycetaspis personata*), Comst., is an addition, really unwished for, to the Coccids fauna of Egypt.

In a small garden of Alexandria, containing a Mango grove of about 50 trees the insect was observed the first time, in great numbers by Abdel Hamid Eff. Ibrahim of the Behera Inspectorate, in December 1931.

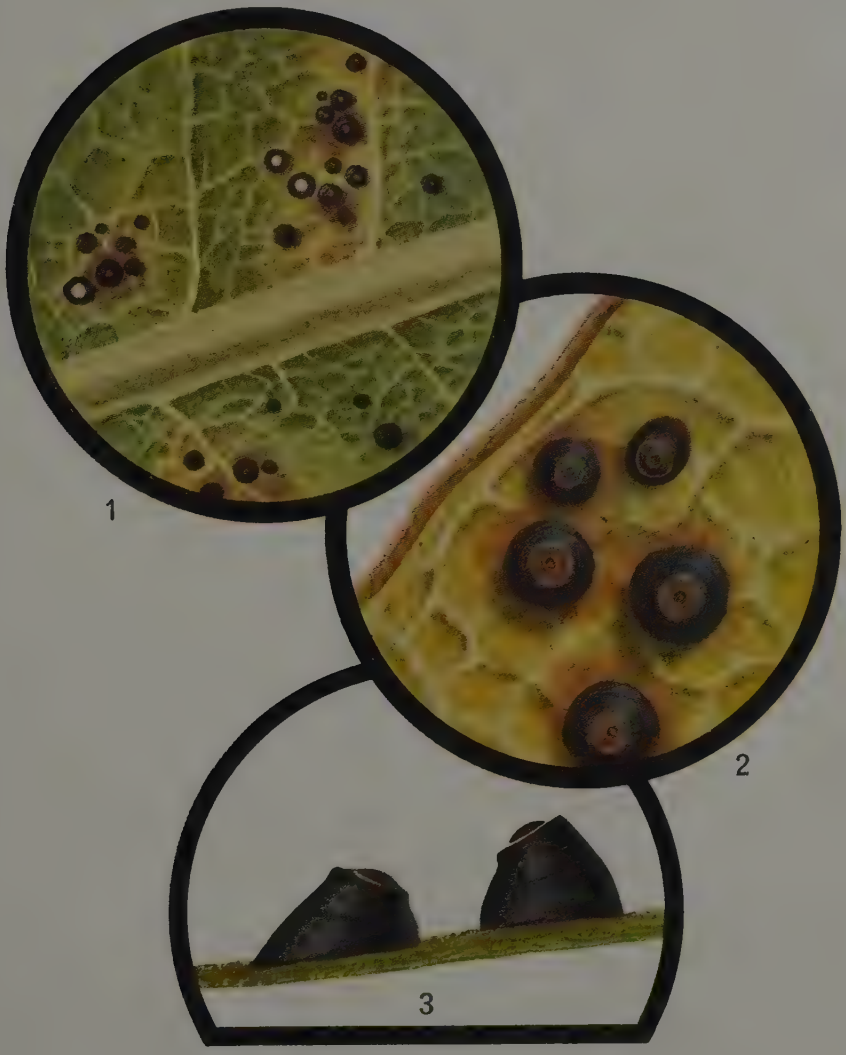
This insect is hitherto recorded from the West Indies, Mexico, British Guiana, and England (there in green-houses), and was later on observed also in Brazil, Guatemala, and the Philippine Islands, and certainly has a wider distribution. After Cockerell it may be a native of the Greater Antilles.

It has a wide range of host-plants, the most important of which are the following:

Anacardiaceæ: *Anacardium occidentale, Mangifera indica.*
Apocynaceæ: *Nerium oleander, Thevetia nereifolia.*
Araliaceæ: *Aralia guilfolei.*
Asclepiadaceæ: *Calotropis procera.*
Bromeliaceæ: *Tillandsia confertiflora, T. corallina, T. saundersi.*
Euphorbiaceæ: *Hevea brasiliensis.*
Jasminaceæ: *Jasminum pubescens.*
Lauraceæ: *Persea gratissima.*
Leguminosæ: *Cassia fistula, Erythrina umbrosa.*
Lythraceæ: *Lawsonia inermis.*
Moraceæ: *Artocarpus incisa, Ficus* spp.
Musaceæ: *Musa sapientum.*
Oleaceæ: *Olea hispanica.*
Palmaceæ: *Latania aurea. Areca rubra, Cocos nucifera.*
Punicaceæ: *Punica granatum.*
Rutaceæ: *Citrus* spp.
Sapindaceæ: *Cupania edulis, Melicocca bijuga.*
Tiliaceæ: *Apeiba tibourbou.*
Vitaceæ: *Vitis vinifera.*

H. Priesner & M. Hosny

Planche II



E. Kassessinoff Pinx.

1.—Part of Mango leaf (underside) with *Chrysomphalus personatus*, Comst., enlarged; white spots, appearing when scale removed.

2.—Part of Mango leaf with four female scales, and one male scale of *Chrysomphalus personatus*, Comst., more greatly enlarged.

3.—Females of *Chrysomphalus personatus*, Comst., lateral view, greatly enlarged.

In Egypt, the insect was found on the following plants, those marked by a cross are not recorded in the former list :

Anacardiaceæ : *Mangifera indica.*
Lauraceæ : + *Laurus nobilis.*
Moraceæ : *Ficus nitida, Ficus* spec.
Musaceæ : *Musa sapientum.*
Myrtaceæ : + *Psidium guyava.*
Palmaceæ : *Latania* sp.
Rosaceæ : *Prunus domestica* (?).
Rutaceæ : *Citrus* spp.

The insect attacks, as far as we know, only the leaves, and causes yellow spots, as it is known from other related Diaspinæ ; both sides of the foliage are infested but more strongly the under side. The injury is very similar to that of the « Black Scale » (*Chrysomphalus ficus*).

In January 1932, the infection was stated to be present along the Bacos Road, comprising the districts of Flemming, Bacos, Sefer, Schutz, and Gianaclis, and on the San Stefano Road, comprising the districts of Zizinia, San Stefano, and Ramleh.

The source of infection can, therefore, not be ascertained any more, neither is it possible to trace the country of origin in our case. The insect may have been present in Egypt for about two to three years at least. It seems to prefer in Egypt the plants, *Mangifera indica*, *Ficus* spp., *Laurus nobilis*, and *Psidium guyava*, while it is only slowly spreading on *Citrus* and Banana.

Strict control measures have been taken by the Ministry of Agriculture to prevent the propagation of this pest which seems to be able to become a major one. We consider it however as very doubtful that complete eradication could be obtained. Fumigation with HCN gas was recommended and spraying with « Volck » in cases where fumigation was not applicable.

Some native parasites have already got hold of the new intruder, as the Chalcididæ, *Aphelinus chrysomphali*, Mercet and *Aspidiotiphagus lounsburyi*, Berl. & Paoli, but as far, their importance as a control factor is negligible.

A description of the insect, accompanied by illustrations may be useful.

Chrysomphalus (Mycetaspis) personatus, Comst.

Adult Female : It is easily recognized, in lateral view, by the great convexity of its scale (Plate II, fig. 3) ; in dorsal aspect (Plate II, figs 1 - 2) it resembles somewhat the Egyptian Black Scale but is much smaller. There is an outer dark zone to be seen which includes an inner, brown area lying almost horizontally on top of the high black scale layers. The diameter of the adult

female scale is about 730 to 790 μ, that of the brown zone 330 - 365 μ, the height of the scale, 495 - 595 μ. The ventral scale has about half the diameter of the whole ventral surface, and is yellowish brown. In removing the scale, a tiny, yellowish white secretionary matter, with some darker concentric rings (Plate II, fig. 1), remains on the leaf.

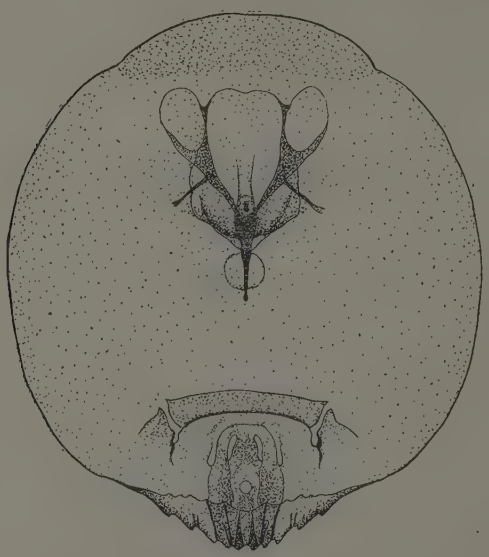


Fig. 4 — *Chrysomphalus personatus*, Comst. : Body of female.

The body of the insect itself (fig. 4) (1) is almost circular, with a hump-like cephalic projection, which retains the stain much better than the rest of the body does. Rostrum very large, particularly its base. Pygidium (fig. 5) very broad, only slightly produced at tip. Vaginal orifice broad, anal opening small, oval, close to the strongly chitinized apical part of the pygidium ; only two subdorsal rows of tubular spinnerets present, dorsals wanting ; margin of pygidium with six pairs of short but well chitinized, and non-separated lobes : the 1st pair rounded-triangular, entire, 2nd pair shorter, in our specimens complete, 3rd pair with two or three notches on outer margin, 4th and 5th pair farther distant from each other, and from the remaining than these from one another, serrate at outer margin, 5th smaller, 6th very small, serrate.

(1) Description of female made in accordance with that given by Newstead (Mon. Brit. Cocc., I, pp. 83 - 84).

Plates short, little fringed, developed only between lobes 1 to 4. Spines small and scarce. Six pairs of long, club-shaped glands present.

Fig. 5 — *Chrysomphalus personatus*, Comst. : Pygidium of female, dorsally.

The Male scale is very similar to that of the female, in colour but asymmetrical, and much flatter, the margin of that part which is most distant from the center is dark brownish.

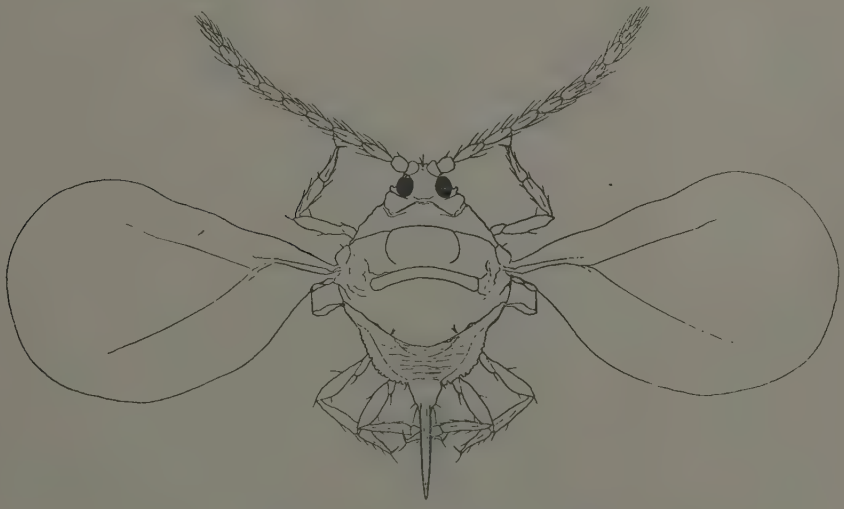


Fig. 6 — *Chrysomphalus personatus*, Comst. : Male.

The male itself (fig. 6) shows little difference from that of *Chrysomphalus ficus*, although it is stouter, with shorter intermediate joints of the antennae, and much narrower basal plate of the metascutum which is easily discernible in both species, by its dark colour. The genital organ (penis) is much longer

in *Chrysomphalus ficus* than in *Ch. personatus*, it is shorter than the width of the thorax in *personatus*, while it is as long as the width of the thorax in *Chr. ficus*.

Some measurements of the males of both species in microns:

	Chrysomphalus personatus	*Chrysomphalus ficus*
Width of wings:	406	364
Width of dark mesonotal plate:	203	168
Length of it:	20	28
Width of thorax:	308	266
Penis:	210	266

Die mir bekannten *Anthidium*-Arten Aegypten's.

(Hymenoptera-Apoidea)

von J. D. Alfken, Bremen.

Von Herrn Professor Dr. H. Priesner, Vorsteher der Entomologischen Untersuchungs-Abteilung des Landwirtschafts-Ministeriums von Aegypten in Cairo wurden mir die in der Sammlung des genannten Instituts aufbewahrten *Anthidium*-Arten zur Bearbeitung überlassen.

Ausser der vor gerade 100 Jahren in den Symbolae Physicae erschienenen Abhandlung von Klug über die ägyptischen Arten dieser Gattung sind nennenswerte Arbeiten darüber nicht erschienen. Es ist daher nicht verwunderlich, dass in der mir überwiesenen Sammlung 5 bislang noch nicht beschriebene Arten enthalten waren; und ich bin davon überzeugt, dass bei planmäszigem Sammeln zu allen Zeiten des Jahres, auch in den heiszen Monaten Juni, Juli und August, sich noch weitere Arten in den noch wenig abgesuchten Wadis und Wüstenrandgebieten auffinden lassen werden. Bei Einsammlung von umfangreicherem Material wird man auch Gelegenheit haben, die Variationsbreite der Arten besser zu erkennen.

Um die aegyptischen Arten sicher bestimmen zu können, war es nötig, die von Klug und Friese beschriebenen zu deuten. Die Typen derselben befinden sich im Zoologischen Museum Berlin. Mein freund Herr Professor Dr. H. Bischoff, Kustos der Hymenopteren-Abteilung am genannten Museum, war so liebenswürdig, eine Anzahl der Arten inbezug auf Merkmale, die für mich zum Erkennen in Frage kamen, zu untersuchen. Er konnte die Artgleichheit von *A. nitidicolle* Fr. mit *A. pulchellum* Klg. and von *A. rufomaculatum* Fr. mit *A. auritum* Klg. und die nahe Verwandtschaft von *A. karschi* Fr. mit *A. alternans* Klg. feststellen und nachweisen, dass die von Friese in den Bienen Europa's als *A. pulchellum* Klg. und *A. tessellatum* Klg. behandelten Arten mit den Typen dieser Klug'schen Arten nicht uebereinstimmen, sondern andere Arten darstellen. Die beiden letzteren sind nebst mehreren anderen des vorliegenden Materials nachstehend als species novae beschrieben worden. Auch die Beschreibung des noch unbekannten Weibchens von *A. karschi* Friese wurde gegeben.

Unbekannt geblieben sind mir von den aus Aegypten beschriebenen Arten: *A. alternans* Klg., *A. helvolum* Klg., *A. waltli* M. Spin. und *A. signiferum* Wlk.

A. decoloratum sp. nov. — ♀ : 12 - 14 mm. lang. Schmutziggelb.

Oberkiefer grob und sparsam punktiert, unten am Grunde mit einem kleinen, glatten Höcker, Spitzenrand schwarz gefärbt, mit 4 stumpfen Zähnen, die sich anscheinend leicht abnutzen; denn bei Tieren, die länger geflogen sind, sind sie weit stumpfer und kürzer als bei frischen. Oberlippe ziemlich glatt, ein wenig gewulstet, braunrot gefärbt. Kopfschild sechseckig, etwa so breit wie hoch, etwas gewölbt, ziemlich dicht und grob, auf der Scheibe etwas sparsamer und grober punktiert, der Vorderrand braunrot gefärbt, fein und dicht gekerbt. Die übrigen Teile des Kopfes dicht und ziemlich kräftig runzelig punktiert, zwischen den Fühlern und am Stirnschildchen glatt. Stirn entweder mit einem sich von der Fühlerwurzel bis an das äuszere Nebenauge hinziehenden, gebogenen, schwarzen Streifen an jeder Seite oder mit schwarzer Färbung an den Fühlerwurzeln und Nebenaugen, selten dort nur gebräunt. Wangen und Stirn, letztere bis an die Nebenaugen, ziemlich dicht abstehend weisz behaart. Fühler braunrot, nach der Spitze hin mehr oder weniger ausgedehnt braun gefärbt. — Mesonotum auf der Scheibe schwarz gefärbt (manchmal ziehen sich von vorn her seitlich in die schwarze Färbung braunrote Streifen), dicht anliegend grau oder graugelb behaart, sehr dicht und ziemlich fein, runzelig punktiert, was unter der dichten Behaarung schwer sichtbar ist. Schildchen vorragend, gewölbt, grob runzelig punktiert, in der Mitte gefurcht, am Hinterrande tief eingebuchtet, Seitenlappen mit ziemlich groszem, stumpfem Zahn. Pleuren dicht und ziemlich kräftig punktiert, dünn weisz behaart. Mittelsegment manchmal schwarz gefärbt, an den Seiten sehr dicht weisz behaart. Mittelfeld fein gerunzelt, dünn weisz behaart, manchmal mit einem kleinen, braunen Fleck. — Hinterleib gedrungen, die Hinterränder der Rückenplatten braunrot gefärbt, in der Mitte des Grundes mit kleinen, dreieckigen oder länglichen, schwarzen oder bräunlichen Flecken, am Grunde dicht und kräftig, an den niedergedrückten Endrändern dicht und fein punktiert, 4. und 5. Platte mehr oder weniger dicht kurz weisz beborstet. 6.Platte meistens nicht gefleckt, dicht und fein anliegend weisz beborstet, der Hinterrand sehr flach eingebuchtet, ungezähnt. Bauchbürste grauweisz. Beine rotgelb, die letzten Fuszglieder hier und da gebräunt, Klauenglied mit sehr kleinem, undeutlichem Pulvillus, innerer Klauenzahn kurz. Flügel ziemlich hell, am Saume getrübt. Die 2. rücklaufende Ader ein wenig hinter der 2. Cubitalzelle mündend, Adern schwarzbraun, Schüppchen gelb, rotbraun gerandet und mit groszem, braunem Mittelfleck.

♂ : 12 - 15 mm. lang. In Grösze, Farbe und Gestalt dem ♀ sehr ähnlich. Das Gesicht dichter weisz behaart, das Mesonotum manchmal mit Ausnahme eines schwarzen Mittelstreifens braunrot gefärbt, die schwarzen Hinterleibsfleckchen fehlend oder nur angedeutet. Die Gestalt der 6. und 7. Hinterleibsplatte ist der bei den Arten der *A. ferrugineum*-Gruppe ähnlich : Die 6. Platte ist hinten an den Seiten schräg abgestutzt, nicht gezähnt, nur geeckt, seitlich am Hinterrande flach eingebuchtet und unregelmäszig gezähnelt, in der Mitte

ein wenig vorgezogen. Die grob punktierte 7. Platte bildet seitlich je einen rundlichen Lappen und ist in der Mitte in ein ziemlich breites, abgestutztes Zäpfchen ausgezogen. Bauchplatten glänzend, ungleichmäszig grob und fein punktiert, in der Mitte mehr oder weniger gelb befilzt, seitlich am Hinterrande mit langen weiszen Wimperhaaren. Schenkelringe der Hinterbeine stumpf gezähnt. Alles übrige wie beim ♀.

Von dieser in Aegypten nicht seltenen Art liegen mir aus meiner Sammlung vor: 1 ♀. Daschor, Mai 1915 (Typus), 1 ♀, Gizah (Paratypus) und 1 ♂, Kerdasa, Juni 1914, (Allotypus) A. Andres leg.; aus der Sammlung des Ackerbau-Ministeriums in Gizah: 1 ♀, Abu Rawash, 1. Mai 1926. 1 ♀, 6. Juni 1930; Kerdasa, 1 ♀, 22. Mai 1926; 1 ♂, Kafr Hakim, 24. Mai 1931; 1 ♀, Pyramiden, 28. Mai 1930; 1 ♀, El Mallah, 26. Juni 1927, (Alle Coll. R. Mabrouk); 1 ♂, Wadi El Garawi, 10. Mai 1927, (Coll. Farag); 1 ♀, 1 ♂, Mazghuna, 26 Mai 1914, (Coll. Zara); 1 ♀, 4 ♂, Mazghuna. 8 Mai 1914, (Coll. Adair). Sämtlich Paratypen.

A. tessellatum Klg. — ♀: 8,5 - 10 mm. lang. Schwarz. Oberkiefer, Kopfschild und Wangen weiszgelb, erstere am Spitzenrande schwarzbraun gefärbt, mit mehreren längeren und kürzeren Zähnchen besetzt. Kopfschild gewölbt, dicht und kurz, ziemlich anliegend behaart; dicht und mäszig stark, unter der Behaarung schwer sichtbar, punktiert, der Vorderrand rötlich, mit einigen, weit auseinanderstehenden, kurzen Kerbzähnchen. Wangen dicht, ziemlich anliegend, weisz behaart. Stirn über den Fühlerwurzeln mit 2 abstehenden Büschelchen gelbroter Haare, die auch das vordere Nebenauge umgeben. Scheitel dünn abstehend. Schläfen dicht anliegend weisz behaart, ersterer mit einer unregelmäszigen gelben Linie, die bis zu den Schläfen herab verläuft. Fühler rot, Schaft und 1. Geiszelglied mehr oder weniger schwarz, die letzten Geiszelglieder schwarzbraun gefärbt. — Mesonotum mit nach der Mitte der Scheibe gerichteten grauweiszen Haaren dicht bekleidet, manchmal mit 2 rundlichen, kleinen, gelben, schwer erkennbaren Flecken vorn an den Seiten. Pleuren und Sternum dicht abstehend weisz behaart. Schildchen vorragend, abgerundet, ziemlich eben, ein wenig glänzend, dicht und ziemlich stark punktiert, dünn behaart, der Hinterrand, wie auch die Seitenlappen, teilweise gelb, teilweise rötlich gefärbt, in der Mitte deutlich eingebuchtet. Seiten des Mittelsegments dicht abstehend weisz behaart. Mittelfeld schwach glänzend, fein gerunzelt. — 1. Rückenplatte des Hinterleibs vorn und an den Seiten dicht abstehend weisz behaart, mit einer mäszig breiten, nach innen verschmälerten, in der Mitte unterbrochenen, gelben Binde. 2 - 5. Platte mit einer in der Mitte dreieckig unterbrochenen und auszerdem seitlich in der Mitte vorn tief rundlich eingeschnittenen gelben Binde, sodass die Binden fast in 4 Flecke aufgelöst sind. 6. Platte fast ganz gelb, nur mit schwarzer Mittelstrieme. 3. Platte mit einzelnen, 4. und 5. mit

zahlreichen Wimperhaaren auf dem Endrande. Punktierung der Rückenplatten am Grunde ziemlich dicht und fein, auf dem schwach niedergedrückten Endrande dichter und feiner. Bauchbürste weisz, hinten in der Mitte mehr oder weniger schwarz gefärbt. Beine rot, Schienen auszen gelb gefärbt. Füsze auszen dicht weiszfilzig, in dem Filz ein kleiner, kahler, rötlicher Fleck. Vorderschenkel unten dicht abstehend weisz behaart. Hinterschienen innen schwarz gefärbt. Klauenglied ohne Pulvillus, innerer Zahn der Klauen lang und dünn. Flügel fast glashell, am Saum nur schwach getrübt; 2. rücklaufende Ader interstitiell; Adern schwarzbraun, Radialzelle mit dunklem Längswisch. Flügelschüppchen gelb, mit groszem, rötlichem Mittelfleck.

♂: 11 - 13 mm. lang. Dem ♀ wenig ähnlich. Schwarz. Oberkiefer mit Ausnahme der rötlichen Spitze und der groszen schwarzbraunen Zähne, Kopschild und Wangen weiszgelb gefärbt, Gesicht dicht weisz behaart, Scheitel mit einem kleinen, rundlichen Fleck oberhalb der Augen. 1. Rückenplatte des Hinterleibs mit 4 gelben, ein wenig rot gesäumten gelben oder roten Fecken, die seitlichen am grösz ten. 2.-5. Platte mit je 4 groszen, gelben oder roten Flecken, die in der Mitte getrennt, seitlich unten mit einander verbunden sind. 6. Platte entweder gelb und hinten rot oder überall gelb und rot gefärbt, mit 3 schwarzen Einschnitten, hinten ein wenig aufgebogen, ganzrandig, fein und zerstreut punktiert. 7. Platte in 2 lange, dünne, nadelspitzige, glatte Dornen ausgezogen, am Grunde über den Dornen glatt und skulpturlos. 4.-6. Platte seitlich mit langen, gebogenen Zähnen. Bauchplatten mehr oder weniger rot gefärbt, die 6. an der Endhälfte ausgehöhlt, daneben höckerig und an den Seiten in einen groszen dreieckigen Zahn ausgezogen. Beine lang abstehend weisz behaart; Hinterhüften dicht weiszfilzig; Hinterschenkel unbewehrt. Das übrige wie beim ♀.

Varietät. ♀. — Der Körper rotbraun gefärbt, daher die gelben Zeichnungen wenig hervortretend.

Die Abbildung von *A. tessellatum* Klg., Symb. Phys., T. 28, Fig. 4, ♂, bezieht sich, wie Freund Bischoff mir gütigst mitteilt, auch auf die hier behandelte Art, nicht aber auf *A. tessellatum* Friese.

A. aegyptiacum Friese. — ♀: 8,5 - 10 mm. lang. Dem *A. tessellatum* Klg. täuschend ähnlich und in den folgenden Merkmalen von diesem abweichend: Stirn gleichmäszig weisz behaart, ohne gelbrote Haarbüschel. Mesonotum auf der Scheibe mit 2 gelben, hinten ein wenig weiter von einander entfernten Linien. Hinterleibsrückenplatten 1 - 5 mit in der Mitte unterbrochener, an den Seitenteilen nur vorn mitten ausgebuchteter, auf der 1. Platte tief eingeschnittener oder in Flecke geteilter gelber Binde. Hinterschienen innen rot gefärbt, selten ein wenig gebräunt.

♂: 11 - 13 mm. lang. 6. Rückenplatte des Hinterleibs vor dem nieder-

gedrückten Endrande grob und dicht punktiert. 7. Platte mit 2 nach innen ein wenig rundlich vorspringenden, am Ende stumpfen Zähnen, über diesen grob gerunzelt. Vorderschienen in der Regel ausgedehnt schwarz gefärbt.

Die Untersuchung des Typus von *A. tessellatum* Klg. hat ergeben, dass das von Friese in den Bienen Europas behandelte *A. tessellatum* nicht mit dem typischen ♂ übereinstimmt. Der Typus hat schlanke, fast nadelspitze, innen nicht vorspringende Endzähne an der 7. Hinterleibsplatte, das *A. tessellatum* Friese gedrungene, mehr stumpf endende, innen rundlich vorspringende Endzähne. (S.Abb.bei Friese).

Die Varietät *aegyptiacum* Friese gehört also nach Ausweis der im Naturhistorischen Museum Wien aufbewahrten 2 typischen Männchen (Schlilluc, Aegypten, leg. Kotschy), wie Kollege Maidl mir gütigst mitteilt, der Art mit den stumpfen Zähnen an, wie sie Friese irrtümlich von *A. tessellatum* abbildet. Später sandte mir Maidl noch ein typisches, von Friese aber irrtümlich « *A. moricei* var. *aegyptiacum* det. Friese, 1897 » bezetteltes ♂. Dies stimmt ebenfalls mit dem *A. tessellatum* Friese, nec Klug überein. Für den letzteren Namen hat also der Name *A. aegyptiacum* Friese einzutreten.

An diesem Fall kann man erkennen, wie notwendig Typenuntersuchungen sind, wenn man über eine Art zur Klarheit kommen will. Es liegen hier 2 nahe mit einander verwandte, aber gut zu unterscheidende, bisher nicht getrennte Arten vor. Klug hat von seinem *A. tessellatum* kein Merkmal angegeben, nach dem sich erkennen lässt, welche der beiden Arten er vor sich hatte. Seine Beschreibung passt auf jede der beiden. Um die von Klug beschriebene Art sicher zu erkennen, bleibt daher nichts anderes übrig als den Typus zu untersuchen.

Es ist zu verurteilen, dass Friese dies für seine doch monographische Bearbeitung der Gattung *Anthidium* in den Bienen Europas unterlassen hat. Hätte er sich der Mühe unterzogen, die Typen Klugs zu untersuchen oder untersuchen zu lassen, so wäre es nicht nötig gewesen, so viele, unangenehme Namensänderungen vorzunehmen. Friese hat für nicht weniger als 3 Arten Klugs neue Namen geschaffen, also nur die Synonyme vermehrt: *A. pulchellum* Klg. = *A. nitidicolle* Fr., *A. echinatum* Klg. = *A. rohlfsi* Fr. und *A. auritum* Klg. = *A. rufomaculatum* Fr. Zwei von ihm behandelte Arten, *A. pulchellum* Friese und *A. tessellatum* Friese, sind nicht mit den betreffenden gleichnamigen Arten Klugs artgleich, sondern noch unbenannte Arten.

Von *A. aegyptiacum* Friese lagen mir vor: 3 St., die von A. Dampf während seiner Internierung im Gefangenenlager zu Maadi 1919 gesammelt wurden: 1 ♀, 7. Aug.; 1 ♂, 21 Juli und 1 ♂, 16. Aug. In meiner Sammlung. — Meadi, 24 und 28 Apr. 12, je 1 ♀. Cairo, 1 ♀, 2 ♂. Coll. Adair. Ezbet el Nakhl, 6 Mai 16; 1 ♂, Kafr Burgash, 7 Juli 26, 1 ♂, Coll. R. Mabrouk; Ibrim, 7. Apr. 31, 1 ♀ Dr. H. Priesner. Sämtliche Exemplare in der Sammlung des Ackerbau-Ministeriums in Gizah.

A. amabile sp. n. — ♀ : 7 - 7,25 mm. lang. Braunrot. Oberkiefer glänzend, gelb gefärbt, rötlich gerandet, an der vorderen Hälfte zerstreut punktiert, der Vorderrand mit ungleichlangen, meist 4 längeren und zwischen dem Endzahn und dem 2. längeren mit 4 ebenfalls ungleichlangen kürzeren, schwarzen Zähnchen besetzt, manchmal zwischen dem 3. und 4. längeren noch ein kürzeres. Kopfschild sechseckig, etwa so hoch wie breit, schwach glänzend, ein wenig gewölbt, dicht und fein runzelig punktiert und weisz behaart, gelb gefärbt, auf der Mitte mit 2 oder 4 dunklen Pünktchen. Stirnschildchen gelb oder rot gefärbt, dicht buschig weisz behaart. Wangen und Stirnseiten gelb gefärbt, diese Färbung zieht sich als schmaler Streifen am inneren Augenrande bis in die gelbe Färbung des Scheitels hin. Stirn dicht weisz behaart, mit einem groszen, viereckigen, bis über die äuszeren Nebenaugen hinaus- und seitlich bis an den gelben Augenstreifen hinausreichenden, schwarzen Fleck. Scheitel und Schläfen gelb gefärbt, letztere am äuszeren Augenrande rot oder schwarzbraun gesäumt. Wangen und Stirn fein, Scheitel und Schläfen etwas stärker, dicht punktiert. Schläfen schmal, nach unten stark verjüngt. Fühler an der Spitze gebräunt, Schaft vorn gelb gefärbt. — Mesonotum kaum glänzend, dicht und ziemlich kräftig, runzelig punktiert, in der Mitte schwarz, die Seiten und der Vorderrand seitlich gelb gefärbt, der letztere in der Mitte mit einem braunroten, nach hinten etwas verlängerten Fleck. Schildchen stark vorragend, glänzend, grob punktiert, der Hinterrand ein wenig wulstig, in der Mitte mit kleinem Einschnitt, am Grunde schwarz, braunrot oder rot, am Ende gelb gefärbt. Seitenlappen nicht gezähnt, hinten mit dem Schildchenhinterrand zusammen fast eine Linie bildend. Pleuren und Sternum lang und dicht, abstehend weisz behaart. Mittelsegment in der Mitte braunrot oder schwarzbraun gefärbt, am Grunde dicht und fein punktiert, am Ende, besonders am Mittelfeld, stark glänzend und ohne Skulptur, an den Seiten dicht, abstehend weisz behaart. — Hinterleib bis zur 5. Platte ziemlich parallelrandig dann schnell verjüngt, die Rükkenplatten am Grunde dicht und fein, auf den niedergedrückten Endrändern sehr dicht und sehr fein punktiert. 1.-5. Platte nahe am Vorderrande mit ziemlich breiter, innen entweder verschmälerter oder schmal unterbrochener oder vorn ausgerandeter, gelber Binde, die Hinterränder manchmal dunkelbraun gefärbt. Die letzte Rückenplatte fast ganz gelb, nur am Ende in der Mitte rot gefärbt, der Hinterrand flach eingebuchtet. Bauchbürste weisz. Beine rot, Hüften, Schenkelringe und Schenkel unten, Schienen und Fersen auszen gelb gefärbt. Fersen auszen dicht, anliegend weisz behaart. Vorder- und Mittelschenkel stark glänzend, grubig vertieft. Die Fuszglieder 2 - 4 oft verdunkelt. Klauenglied ohne Pulvillus, innerer Zahn der Klauen kurz. Flügel ein wenig getrübt, Adern schwarzbraun, die 2. rücklaufende ein wenig hinter der 2. Cubitalzelle mündend. Schüppchen gelb, mit rotbraunem Seitenrand und groszem, rotbraunem Mittelfleck.

♂ : 8,5 - 9,5 mm. lang. Dem ♀ sehr ähnlich. 6. Hinterleibsplatte an den Seiten mit einem kräftigen, hell durchscheinenden Zahn, der Hinterrand neben diesem tief ausgebuchtet, in der Mitte etwas vorgezogen und eine rechtwinkelige Platte bildend. 7. Platte bogenförmig, ganzrandig, am Hinterrande schwach wellig. Bauchplatten sparsam und fein punktiert, die Hinterränder sanft eingebuchtet, die Endplatte grubig eingedrückt, in der Mitte gefurcht.

Von dieser dem *A. pulchellum* Klg. in der Färbung ähnlichen Art. die Friese auch als *A. pulchellum* ansah, konnte ich die folgenden Stücke untersuchen :

Mansouriah, 1 ♀, 22. Aug. 1925, Coll. R. Mabrouk (Typus in der Sammlung des Ackerbau-Ministeriums in Gizah). 1 ♀, 14 Juli 25 ; 1 ♀, 30 Aug. 24, Kafr Hakim ; 1 ♀. 22 Juli 25 ; 1 ♀, 7. - 8. Aug. 24, Coll. R. Mabrouk. 1 ♂, 14 Juli 28. Coll. M. Ali Soliman ; Abu Rawash, 1 ♂, 15 Aug. 25, 1 ♂, 17 Aug. 27, Coll. R. Mabrouk ; Kerdasah, 1 ♀, 5 Juli 25, Coll. R. Mabrouk ; Wasfia, 1 ♀, 16 Sept. 25, Coll. M. Tawfik ; Aswan, 1 ♂, 17 Apr. 21, Capt. R. J. Hayward (Letzterer Allotypus, in meiner Sammlung).

A. pulchellum M. Spin., Ann. soc. entom. France, v. 7, p. 526, 1838, ist ebenfalls als Synonym zu *A. amabile* sp. n. zu stellen.

A. karschi Friese. — ♀ : 6 mm. lang. Kopf und Thorax strohgelb, Seiten des Mittelsegments und Hinterleib blassrot gefärbt. Oberkiefer lang, gekreuzt, blassgelb, mit 5 braunschwarzen Zähnen, der Endzahn sehr kräftig, gebogen und spitz. Oberlippe schmal, glänzend. Kopfschild trapezförmig, fast so hoch wie breit, eben, matt, dicht und fein punktiert, auf der Vorderhälfte dünn weisz behaart, der Vorderrand rötlich gefärbt und schwach gekerbt. Stirnschildchen und Wangen ein wenig sparsamer und stärker punktiert als das Kopfschild, ersteres seitlich ein wenig glatt und glänzend. Stirn, Scheitel und Schläfen feiner und dichter punktiert, die erstere ziemlich dicht weisz behaart. Aus der gelben Farbe heben sich die dunklen Nebenaugen scharf hervor. Fühlerschaft hellgelb, Geiszel rötlich gefärbt, das Endglied dunkel. — Mesonotum matt, sehr dicht und fein punktiert, sehr kurz und dünn behaart. Pleuren dicht und fein punktiert, wie das Sternum ziemlich dicht abstehend weisz behaart. Schildchen vorragend, wie die Seitenlappen abgerundet, in der Mitte des Endrandes schwach eingedrückt und ausgerandet, nebst den Seitenlappen heller, fast weiszgelb gefärbt, etwas stärker als das Mesonotum punktiert. Mittelfeld des Mittelsegments glänzend.—Rückenplatten des Hinterleibs dicht und fein punktiert, 1.-5. Platte am Hinterrande breit, häutig, silberfarben durchscheinend, unter der Haut mehr oder weniger schwarz gefärbt. Endplatte in der Mitte schwach vorgezogen, seitlich schwach eckig. Bauchbürste weisz. Beine unbewehrt, gelb, Füsze teilweise rötlich

gefärbt. Klauenglied ohne Pulvillus, innerer Zahn der Klauen ziemlich lang und spitz. Flügel glashell, schwach milchig. Adern braun, Subcosta heller; Schüppchen hellbraun, vorn weiszlich.

Das ♂ dieser Art stimmt in der Gestalt der Endplatte des Hinterleibs durchaus mit dem von *A. alternans* Klg. überein; es ist nicht ausgeschlossen, dass in der vorliegenden Art die hellste Färbung des *A. alternans* Klg. vorliegt.

1 Stück, Wadi Digla, 4 Juli 1926, Coll. A. Alfieri.

A. ochrognathum sp. nov. — ♀ : 6 mm. lang. Schwarz. Oberkiefer gelbrot, mit kurzen braunen Zähnchen an der Spitze. Kopfschild trapezförmig, ein wenig höher als breit, schwach gewölbt, oben in der Mitte glänzend, kräftig und zerstreut punktiert, der Vorderrand ein wenig eingebuchtet und daneben mit kurzem Zähnchen, kurz abstehend weisz behaart. Stirnschildchen matt, dicht und fein, etwas runzelig punktiert. Wangen, Stirn und Scheitel dicht und kräftig punktiert. Zwischen dem vorderen Nebenauge und dem Stirnschildchen ein Höckerchen. Scheitel hinten seitlich mit einem kleinen, nach innen verschmälerten, gelben Fleck. Schläfen oben breit, nach unten stark verjüngt, glänzend, ziemlich dicht und stark punktiert. Fühlerschaft schwarz, 1. Geiszelglied braun, die übrigen rot gefärbt. — Mesonotum glänzend, auf der Scheibe ziemlich grob und mäszig dicht punktiert, die Punkte hier und da zusammenflieszend, im Umkreise feiner und dichter punktiert. Schildchen ein wenig gewölbt, vorstehend, ziemlich stark und dicht punktiert, der Hinterrand in der Mitte etwas eingedrückt und ausgerandet, seitlich sehr schmal rot gefärbt. Seitenlappen abgerundet. Pleuren dicht und fein punktiert, wie das Sternum sehr dünn weisz behaart. Mittelfeld des Mittelsegments glänzend. — Hinterleib gedrungen, dicht und kräftig punktiert, die Hinterränder mehr oder weniger deutlich gelblich oder weiszgelb durchscheinend. 1.-4. Platte, wie bei *A. lituratum* Pz., an jeder Seite mit einem kleinen, etwa eiförmigen, hier und da rot gesäumten, gelben Querfleck; die Flecke der 1. Platte dicht am Seitenrande, die der übrigen etwas weiter davon entfernt stehend. 5. und 6. Platte dicht runzelig punktiert. Schenkelspitze, Schienen und Füsze rot gefärbt. Klauenglied ohne Pulvillus. Flügel ziemlich hell, Saum schwach getrübt; Adern schwarzbraun. Schüppchen gelbrot, vorn heller.

1 Stück. Abu Rawash. 7. August 1926. Coll. R. Mabrouk. Typus, in der Sammlung des Ackerbau-ministeriums.

♂ : 5 mm. lang. Dem ♀ sehr ähnlich. Körper überall dünn, auf der Stirn dichter, abstehend weisz behaart. Oberkiefer gelb gefärbt. Letzte Rückenplatte des Hinterleibs am Ende in der Mitte sehr flach eingebuchtet. 6. Platte hinten in der Mitte und die 7. ganz blutrot gefärbt. 3. und 4. Bauchplatte filzig gelblichbraun behaart. Alles Uebrige, auch die Befleckung des Hinterleibs, wie beim ♀.

1 Stück, Wadi Assiouti, 25 April 1926, Coll. Kassim (Allotypus, ebenfalls in der Sammlung der Ackerbau-Ministeriums in Gizah).

Die vorliegende Art ist dem *A. lituratum* Pz. so nahe verwandt, dass sie vielleicht als Färbung desselben anzusehen ist; immerhin weicht sie so beträchtlich von der typischen Form des *A. lituratum*, die übrigens auch in Aegypten vorkommt, ab, dass sie benannt zu werden verdient.

A. denticulatum sp. nov. — ♀ : 7,5 mm. lang. Schwarz. Oberkiefer mit Ausnahme des wenig und stumpf gezähnten, schwarzen Spitzenrandes, Kopfschild und ein kleiner, dreieckiger Fleck unten an den Wangen rot. Kopfschild etwa so breit wie hoch, glänzend, ziemlich grob und mäszig dicht punktiert. Stirn dicht runzelig punktiert, an den Fühlerwurzeln struppig und dicht, über diesen dünn abstehend weisz behaart. Scheitel und der obere Teil der Schläfen rot gefärbt, ersterer dicht und fein punktiert, hinten ein wenig aufgeworfen, scharf gerandet, wie abgeschnitten, und hell durchscheinend. Schläfen schmal, dünn abstehend weisz behaart. Fühler rot, an der Spitze ein wenig gebräunt. — Mesonotum flach, matt, sehr dicht und ziemlich kräftig punktiert. Mesopleuren rot gefärbt, grob gerunzelt, vorn scharf gerandet und weiszlich durchscheinend. Schildchen flach, mit den Seitenlappen zusammen ein Trapez bildend, matt, ziemlich grob und dicht punktiert, Seitenlappen, Hinterrand und ein Teil des Seitenrandes rot gefärbt; der äuszerste, geradlinig begrenzte Hinterrand gelbweisz durchscheinend. — Hinterleib gewölbt, glänzend, nach hinten verschmälert, die Rückenplatten in der Mitte feiner, an den Seiten kräftiger punktiert, 1.-5. Platte mit je einem gelben Seitenfleck, in den sich von auszen her ein roter Fleck einschiebt; der 1. Fleck dicht am Rande liegend und vorn rot gefärbt; die Flecken der 3.-5. Platte in der Mitte durch rot verbunden. 6. Platte rot gefärbt, dicht und grob runzelig punktiert, in der Mitte des Seitenrandes stumpf gezähnt. 1. - 5. Platte seitlich mit an den hinteren Platten länger werdenden, hell durchscheinenden, gebogenen Zähnchen. Bauchplatten seitlich rot gefärbt, Bürste weisz. 1. Platte kahl, glänzend, ziemlich grob punktiert, rot gefärbt, in der Mitte mit einer mitten scharf gekielten, vorn in einen Dorn auslaufenden, an den Seiten gerandeten, sparsam punktierten, schwarzen Erhebung. Beine rot, Mittel-und Hinterfersen ganz, Hüften, Schenkelringe und Schenkel teilweise schwarz gefärbt. Klauenglied mit sehr kleinem Pulvillus. Flügel rauchig getrübt, in der Mitte mit einem glashellen Querstreifen im Laufe der Discoidalzellen. 2. rücklaufende Ader stark gebogen, weit auszerhalb der 2. Cubitalzelle mündend. Adern schwarz. Schüppchen rot.

Ein Stück, Wadi Edeib, Gebel Elba, 18 - 26.1.1930, S. E. Desert. (Holotypus, in der Sammlung des Ackerbau-Ministeriums in Gizah).

Die vorliegende Art ist an den vielen plastischen und Färbungsmerkmalen leicht kenntlich. Das Stück, leider beschädigt, einige Fuszglieder und das

rechte Hinterbein fehlen, und der Hinterleib ist angeleimt, hat ein fremdartiges Aussehen.

Wegen des hinten abgestutzten und häutigen Schildchens in die Untergattung *Pachyanthidium* Friese zu stellen. Sehr ähnlich dürfte *A. cucullatum* Friese vom Kapland und der Delagoa Bai sein, das eine ähnliche Hinterleibszeichnung hat. Bei diesem soll aber die 6. Hinterleibsplatte viereckig sein, und die Flügel sollen einen glashellen Grund haben. Friese erwähnt auch die Bezahnung der Hinterleibsplatten und die auffallende Gestalt der 1. Bauchplatte nicht. Wie Freund Bischoff mir mitteilt, weisen die Typen beides auf.

Schluessel zum Bestimmen der Arten.

♀

1. Rückenplatten 2 und 3 des Hinterleibs am Hinterrande in der Mitte vorgezogen und etwas aufgerichtet. Seitenlappen des Schildchens zahnartig vorspringend ..... **2.**

— Rückenplatten 2 und 3 des Hinterleibs am Hinterrande in der Mitte nicht vorgezogen ..... **4.**

2. Hinterränder der Rückenplatten 1 - 5 des Hinterleibs nicht emailleartig weisz gefärbt ..... **3.**

— Hinterränder der Rückenplatten 1 - 5 fast chitinös, emailleartig weisz gefärbt. 7,5 - 8 mm. lang ..... **A. cinctum** Klg.

3. Hinterränder der Rückenplatten 1 - 5 deutlich und breit hell durchscheinend. 2. Platte in der Mitte der Grundhälfte weniger dicht punktiert, an der Spitzenhälfte vor der abstehenden Platte zerstreut; diese Platte hinten in der Mitte nicht ausgebuchtet. Kopfschild sehr grob punktiert, in der Mitte mit gröszerer, glatter, striemenartiger Stelle. Kürzer, 6 - 8 mm. lang ..... **A. limbiferum** F. Mor.

— Hinterränder der Rückenplatten 1 - 5 nicht oder undeutlich und schmal, oft nur an einigen Platten, hell durchscheinend. 2. Platte in der Mitte der Grundhälfte dicht, an der Spitzenhälfte vor der abstehenden Platte dicht punktiert; diese hinten in der Mitte ausgebuchtet. Kopfschild grob punktiert, in der Mitte mit kleiner, glatter Stelle. Länger, 7 - 10 mm. lang ..... **A. ferrugineum** F.

4. Körper gelblich oder gelbrot gefärbt ..... **5.**

— Körper schwarz gefärbt, mit gelber oder roter Zeichnung ..... **6.**

5. Kleine Art, 6 mm. lang. Kopf und Thorax strohgelb, Hinterleib blassrot

gefärbt, mit silberfarben durchscheinenden Endrändern. Flügel glashell ..... **A. karschi** Friese.

— Gröszere Art, 11 - 13 mm. lang. Körper schmutzig gelblich gefärbt. Stirn an den Fühlerwurzeln und Nebenaugen, Scheibe des Mesonotum und kleine dreieckige, manchmal seitlich bindenartig erweiterte Flecke am Grunde der Rückenplatten des Hinterleibs schwarz, Hinterränder der letzteren bräunlichrot gefärbt. Mesonotum dicht und kräftig, runzelig punktiert. Flügelwurzel getrübt. 12 - 14 mm. lang ..... (*afrum* Alfk., nec Lep.) **A. decoloratum** sp.n.

6. Die Rückenplatten des Hinterleibs mit gelben oder roten Seitenflecken ..... **7.**

— Die Rückenplatten des Hinterkeibs mit hellen Binden ..... **9.**

7. Rückenplatten 1 - 4 mit gelben Seitenflecken..... **8.**

— Rückenplatten 1 - 5 mit dunkelroten Seitenflecken. Gesicht und Fühler schwarz gefärbt. Seiten des Hinterrandes vom Schildchen und seine Seitenlappen dunkelrot. 9 mm. lang. ..... (*rufomaculatum* Friese) **auritum** Klg.

8. Wangen mit rundlichem gelbem Fleck. Scheitel mit breitem gelbem Fleck. Oberkiefer blutrot, bei mitteleuropäischen Stücken schwarz gefärbt. 6 - 7 mm. lang. ..... **A. lituratum** Pz.

— Wangen einfarbig schwarz. Scheitel mit schmalem, gelbem Fleck. Oberkiefer gelbrot. 6 mm. lang ..... **A. ochrognathum** sp.n.

9. Hinterränder der Rückenplatten 3 - 5 des Hinterleibs dicht weiszfilzig behaart ..... **10.**

— Hinterränder der Rückenplatten 3 - 5 ohne weiszfilzige Behaarung **11.**

10. Kopf schwarz gefärbt. Scheitel oberhalb der Augen mit einem kleinen, gelben Fleck. Mesonotum schwach glänzend, mäszig dicht und fein punktiert. Hinterleibsbinden breit, vorn dreieckig eingeschnitten, gelb gefärbt. 10,5 - 11,5 mm. lang .... (*rohlfsi* Friese) **A. echinatum** Klg.

— Oberkiefer, Kopfschild, Wangen und Hinterkopf weiszgelb gefärbt. Mesonotum stark glänzend, glatt, einzeln punktiert. Hinterleibsbinden schmal, gleich breit, schneeweisz gefärbt. 8 mm. lang. (Nach Mitteilung von Bischoff und der Beschreibung von *A. nitidicolle* Friese) ..... (*nitidicolle* Friese) **A. pulchellum** Klg.

11. Endplatte des Hinterleibs hinten ganzrandig, auf der Scheibe nicht eingefärbt ..... **12.**

— Endplatte des Hinterleibs hinten in der Mitte in 2 kleine Zähne auslaufend, auf der Scheibe eingedrückt. Kopf bis auf einen groszen, schwarzen Stirn-und Scheitelfleck, Schildchen mit Ausnahme des schwarzen Vorderteiles nebst den Seitenlappen und die mehr oder weniger unterbrochenen Hinterleibsbinden hellgelb. Beine und Bauchbürste gelbrot gefärbt. 7 mm. lang ..... **A. enslini** Alfk.

12. Gröszere Arten: 8,5 - 11 mm. lang. Bauchbürste an der Spitze schwarz gefärbt ..... **13.**

— Kleinere Arten: Höchstens 7,5 mm. lang. Bauchbürste weiss .... **14.**

13. Stirn mit 2 Büscheln gelbroter Haare. Mesonotum dicht behaart. Scheitel ohne gelben Längsstrich. 1. Rückenplatte des Hinterleibs vorn und seitlich sehr dicht behaart. Die gelben Bindenteile vorn in der Mitte tief rundlich ausgeschnitten, sodass fast 4 Flecke vorhanden sind. Hinterschienen innen schwarz gefärbt. 8,5 - 10 mm. lang. **A. tessellatum** Klg.

— Stirn gleichmäszig weisz behaart. Mesonotum locker behaart. Scheitel in der Regel mit gelbem Längsstrich. 1. Rückenplatte des Hinterleibs vorn und seitlich dünn behaart. Die gelben Bindenteile vorn nicht ausgeschnitten, höchstens flach eingebuchtet. Hinterschienen innen rot gefärbt, selten ein wenig gebräunt. 9,5 - 11 mm. lang. .... (*tessellatum* Friese, nec Klg) **A. aegyptiacum** Friese.

14. Der gelbe Wangenfleck als schmaler Streifen am inneren Augenrande nach oben in die gelbe Färbung des Scheitels verlaufend. Schläfen schmal. Hinterrand des Schildchens ein wenig gewulstet. Hinterleib rot, oder rot mit braunen Endrändern der Rückenplatten oder rot und braun gefärbt, die Rückenplatten 1 - 5 stets mit gelber, auf einigen Platten manchmal verschmälerter oder in der Mitte unterbrochener Binde. Mesonotum dicht, ziemlich kräftig, etwas runzelig punktiert. 7 - 7,25 mm. lang. .....(*pulchellum* Friese, nec Klg) **A. amabile** sp.n.

— Wangenfleck kurz, nicht nach oben verlängert. Scheitel schwarz, mit kleinem rundem, gelbem Fleck. Schläfen breit. Hinterrand des Schildchens nicht gewulstet. Hinterleib schwarz, mit breiten, mehr oder weniger unterbrochenen oder vorn ausgerandeten, gelbroten Binden. Mesonotum dicht und ziemlich grob punktiert. Punktierung der Rückenplatten des Hinterleibs ziemlich grob. 7 mm. lang..... **A. xanthopygum** Klg.

♂

1. Die Rückenplatten 4 - 6 des Hinterleibs an den Seiten gezähnt ... **2.**

— Die Rückenplatten 4 - 6 an den Seiten nicht gezähnt ..... **3.**

2. Zähne der 7. Platte breit und stumpf, innen, etwa in der Mitte, ein

wenig rundlich erweitert. Die 7. Platte am Grunde über den Zähnen grob gerunzelt. 6. Platte grob und dicht punktiert. 11 - 13 mm. lang... ..... **A. aegyptiacum** Friese.

— Zähne der 7. Platte schmal und spitz, innen nicht erweitert. Die 7. Platte am Grunde glatt und glänzend, fast ohne Skulptur. 6. Platte fein und zerstreut punktiert. 11 - 13 mm. lang. ..... **A. tessellatum** Klg.

3. Die 7. Platte des Hinterleibs seitlich einen rundlichen Lappen bildend, der Hinterrand der Platte mit einem mehr oder weniger vorstehenden Zäpfchen. Schenkelringe der Hinterbeine gezähnt ..... **4.**

— Die 7. Platte des Hinterleibs anders gebildet ..... **7.**

4. Kleinere Arten, 7,5 - 10 mm. lang ..... **5.**

— Grösszere Art. 12 - 15 mm. lang. 6. Hinterleibsplatte seitlich sehr stumpf gezähnt. Zäpfchen der 7. Platte breit und ziemlich lang. Farbe des Hinterleibs gelblich, die Hinterränder der Rückenplatten rot .... **A. decoloratum** sp. n.

5. Hinterränder der Rückenplatten des Hinterleibs häutig, grau gefärbt.. **6.**

— Hinterränder der Rückenplatten des Hinterleibs chitinös, emailleartig, weisz gefärbt. Seitenzahn der 6. Platte klein und gebogen. 7 - 10 mm. lang..... **A. cinctum** Klg.

6. Hinterränder der Rückenplatten des Hinterleibs deutlich durchscheinend. 6. Platte seitlich schräg abgestutzt und dann stumpf gezähnt. 1.-3. Platte seitlich am Hinterrand dicht weiss behaart. 8,5 - 10 mm. lang.. ..... **A. limbiferum** F.Mor.

— Hinterränder der Rückenplatten des Hinterleibs nicht oder undeutlich durchscheinend. Seitenzahn der 6. Platte grosz, dreieckig und gebogen. 1. - 3. Platte seitlich am Hinterrande meist locker weiss behaart. 9 - 10,5 mm. lang. ..... **A. ferrugineum** F.

7. Die 7. Platte des Hinterleibs unbewehrt, der Hinterrand schwach eingebuchtet ..... **8.**

— Die 7. Platte des Hinterleibs anders gebildet ..... **10.**

8. Kopfschild, Wangen und manchmal auch der untere Teil des Stirnschildchens gelb gefärbt ..... **9.**

— Gesicht schwarz gefärbt. 1 - 4. Hinterleibsrückenplatte seitlich mit je einem kleinen, gelben Fleck. 6. Platte an der Spitze in der Mitte und die 7. ganz rot gefärbt. 5 mm. lang. ..... **A. ochrognathum** sp.n.

9. Rückenplatte 1 - 5 jederseits mit einem rundlichen, gelben Fleck. Schen-

kel schwarz, an der Spitze rot gefärbt. 6 - 7,5 mm. lang. .....
..... **A. lituratum** Pz.

— Rückenplatte 1 - 5 mit breiter, in der Mitte mehr oder weniger unterbrochener oder eingebuchteter, gelbroter Binde. Schenkel rot, am Grunde schwarz gefärbt. 6 - 7 mm. lang. ..... **A. xanthopygum** Klg.

10. Hinterrand der 6. Rückenplatte des Hinterleibs in der Mitte der Platte anliegend. Hinterrand der 7. Platte ausgerandet oder gezähnt .... **11.**

— Hinterrand der 6. Rückenplatte des Hinterleibs in der Mitte aufgebogen, seitlich ausgebuchtet und scharf gezähnt. 7. Platte bogig abgerundet, ohne Auszeichnung. Hinterleib rostrot, mit schmalen ganzen oder schwach unterbrochenen, gelben Binden nahe am Vorderrande. 8 - 9,5 mm. lang ..... **A. amabile** sp.n.

11. Die 7. Rückenplatte nicht zweilappig ..... **12.**

— Die 7. Rückenplatte tief eingeschnitten, in 2 Lappen ausgezogen. Hinterleib schwarz gefärbt, 1.-5. Platte mit in der Mitte, die 1.am weitesten, dann immer schmaler unterbrochenen, gelben Binden. 8,5 mm. lang ..... **A. enslini** Alfk.

12. Hinterrand der 7. Rückenplatte in der Mitte rundlich ausgeschnitten, die Mitte des Ausschnitts gezähnt ..... **13.**

— Hinterrand der 7. Rückenplatte in der Mitte granzrandig, mit 2 winzigen Höckern, die nach vorn zahnartig verlängert sind ..... **15.**

13. Mesonotum matt, dicht und ziemlich stark punktiert ..... **14.**

— Mesonotum glatt, glänzend, fein und sparsam punktiert. Schildchen nebst Seitenlappen glatt, glänzend, sehr zerstreut punktiert, emailleartig, dick aufliegend, gelbweisz gefärbt. 8 - 8.5 mm. lang... **A. pulchellum** Klg.

14. Hinterleib rostrot, mit breiten gelben Binden, die Hinterränder von der 2. Platte an mehr oder weniger dicht mit weiszen Borstenhaaren besetzt. 7. Platte neben Ausrandung ausgeschweift. 11 - 11,5 mm. lang. ..... **A. echinatum** Klg.

— Hinterleib schwarz, 1.-6. Platte mit dunkelroten Seitenflecken, die Hinterränder nicht weisz behaart. 7. Platte neben der Ausrandung schräg nach vorn verlaufend. 9 mm. lang ..... **A. auritum** Klg.

15. Körperfarbe schwarz. 1.-5. Rückenplatte des Hinterleibs mit schmaler gelber Binde. (Nach Klug). 6.5 mm. lang ..... **A. alternans** Klg.

— Körperfarbe gelb, Mesonotum mit 3 schwarzbraunen Längsflecken. Mit-

telfeld des Mittelsegments mit kleinem, rundem, braunem Fleck. 5 - 7,5 mm. lang. ..... **A. karschi** Friese.

Bemerkungen zu den Arten.

A. ferrugineum F., **A. cinctum** Klg. (1) und **A. limbiferum** F. Mor. — Diese 3 Arten stimmen in den wesentlichen plastischen Merkmalen so sehr mit einander überein, (vor allem haben bei allen die ♀ den vorspringenden Hinterrand der 2. und 3. Rückenplatte des Hinterleibs und die ♂ dieselbe Bildung der 7. Hinterleibsplatte) dass man sie als Formen derselben Art ansehen kann; und es bleibt dem Ermessen des Einzelnen überlassen, wie er sich in dieser Hinsicht entscheiden will.

A. ferrugineum als die zuerst beschriebene Art ist als Nominatform, und die beiden anderen sind als Subspecies zu nehmen.

A. ferrugineum F. wurde aus Spanien beschrieben. Ich besitze von dort nur ein ♀ und finde dies viel reiner und dunkler rot gefärbt als die ägyptischen Stücke; ich möchte, vorausgesetzt, dass dies stets der Fall ist, dahin aussprechen, dass man der ägyptischen Form, bei der das Rot heller, mehr gelbrot ist, den Namen *A. aegypticolum* var. nov. verleiht.

Die Färbung des *A. ferrugineum* F. ist sehr veränderlich. Nechstehend sind einige davon im weiblichen Geschlecht behandelt.

A. Körper schwarz, Hinterleib rostrot gefärbt, ohne gelbe Binden.

1. Rückenplatten 2 - 4 am Grunde in der Mitte mit kleinem, dreieckigem, schwarzem Fleck. — Var. **aegypticolum** var. nov.

2. Wie voriges, aber die schwarzen Flecke verschwommen.

3. Wie 1. aber die Flecke auf den Platten 3 und 4 bindenartig erweitert.

4. Hinterleib nur auf der 3. Platte am Grunde mit einem groszen, schwarzen Fleck.

5. Platte 2 und 3 mit verschwommenem, Platte 4 mit groszem Fleck.

6. Fast ungefleckt, Platten 2 - 4 nur am Grunde in der Mitte ein wenig gebräunt.

B. Körper schwarz. Hinterleib rot, Rückenplatten 1 - 5 mit verwaschenen, in der Mitte rotbraun unterbrochenen, gelben Binden. — Var. **subzonatum** var. nov.

C. Körper fast ganz rot gefärbt, Hinterleib mit oder ohne gelbe Binden. Schwarz sind: eine Stelle um die Nebenaugen, das Mesonotum in mehr oder weniger groszer Ausdehnung und die Seiten des Mittelsegments, manchmal nur einige dieser Körperteile. — Var. **thoracicum** Klg.

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(1) Meine Angabe, Senckenbergiana, v. 8, p. 127, 1926, dass bei *A. cinctum* Klg. die Hinterränder der Hinterleibs rückenplatten nicht vorstehen, ist falsch; es ist doch so.

Es darf nicht unerwähnt bleiben, dass M. Spinola schon, Ann. soc. entom. France, v. 7, p. 522, 1838, die Varietäten dieser Art behandelte, aber mehrere heute als Arten aufgefasste Formen dazu zählte, so *A. cinctum* Klg. und *A. decoloratum* sp.n.

A. decoloratum sp. n. — Diese Art wurde von mir, Senckenbergiana, v. 8, p. 126, 1926, irrtümlich als *A. afrum* Lep. behandelt. Nunmehr habe ich jedoch eingesehen, dass sie nicht auf diese algerische Art zu beziehen ist. In dieser Ansicht werde ich dadurch bestärkt, dass Gribodo in Bull. Soc. Ent. Ital., v. 27, p. 92, 1894, angibt, dass *A. afrum* Lep. an den Seiten der 4. und 5. Hinterleibsrückenplatte kleine, spitze Zähnchen besitzt, die die vorliegende ägyptische Art nicht aufweist. In ihr haben wir es mit einer noch unbeschriebenen Art zu tun, die ich *A. decoloratum* nannte.

Sie gehört in die Gruppe des *A. ferrugineum* F. und ist gleichsam eine vergröszerte Ausgabe dieser Art. Beide Geschlechter lassen sich an der unauffälligen, schmutzig gelb und roten Färbung erkennen. Das ♀ zeichnet sich auszerdem durch die kleinen, dunklen Flecke mitten am Grunde der Hinterleibsrückenplatten und das ♂ durch den stumpfen Zahn am hinteren Schenkelring und das breite Zäpfchen mitten am Hinterrande der 7. Platte aus.

A. echinatum Klg. — Ich habe schon früher, Senckenbergiana, v. 8, p. 127, 1926, das *A. rohlfsi* Friese als mit dem *A. echinatum* Klg. artgleich bezeichnet. Neuerdings haben Bischoff und ich die Typen dieser beiden Arten im Zoolog. Museum Berlin untersucht; wir konnten feststellen, dass sie einander gleichen. *A. echinatum* Klg. lässt sich in beiden Geschlechtern an den dicht weisz behaarten oder befilzten Hinterrändern der Rückenplatten 3 - 5 (6) des Hinterleibs erkennen.

A. pulchellum Klg. läszt sich von den übrigen Arten durch des glatte, glänzende und sparsam punktierte Mesonotum unterscheiden, ein Merkmal, das bei den *Anthidium*-Arten selten vorkommt. Die Hinterränder der Rückenplatten 3 - 5 sind, wie bei der vorigen Art, dicht anliegend weisz behaart. Das ♀ kenne ich nur aus der Beschreibung.

A. tessellatum Klg. und **A. aegyptiacum** Friese. — Zwei nahe verwandte, aber durch mehrere beständige Merkmale gut zu unterscheidende Arten. Die ♂ sind an den bedornten Hinterleibsplatten, die ♀ an der zweifarbigen Bauchbürste kenntlich. Es ist möglich, dass *A. waltli* M. Spin., von dem nur das ♀ beschrieben wurde, mit *A. tessellatum* Klg. artgleich ist. Die Beschreibung des ersteren lässt sich bis auf das « dos presque glabre » gut auf *A. tessellatum* beziehen. Weder bei dem letzteren, noch bei *A. aegyptiacum* ist das Mesonotum glatt zu nennen. Es bleibt noch zu untersuchen, ob *A. signiferum* Wlk. auf *A. waltli* M. Spin. zu beziehen ist.

A. xanthopygum Klg. und **A. ochrognathum** sp.n. sind Formen von *A. lituratum* Pz., das sich in Aegypten stark zu spalten scheint. Die erstere kann als die helle, die letztere als die dunkle Färbung des *A. lituratum* Pz. aufgefasst werden.

A. enslini Alfk. hat in Aegypten keine Verwandte; es steht im männlichen Geschlecht dem *A. eximium* Gir. sehr nahe, im weiblichen wegen der am Hinterrande gezähnten 6. Hinterleibsplatte allein da.

A. karschi Friese und **A. alternans** Klg. sind vermutlich Formen einer Art; ich kenne das letztere nur aus der Beschreibung, kann daher sicheres nicht angeben. Siehe die Beschreibung des Weibchens von *A. karschi* Friese (Seite 103).

A. amabile sp.n. steht in der Gestalt der 7. Rückenplatte des Hinterleibs beim ♂ und in der Gesichtszeichnung beim ♀ gesondert da.

A. auritum Klg. ist in beiden Geschlechtern an der auffallend dunkelroten Körperzeichnung kenntlich. Ich besitze es nur aus Jericho, 20 - 28 April 1927, leg. E. Enslin. Herr Professor Bischoff war so liebenswürdig, die Uebereinstimmung meiner Stücke, sowie die des *A. rufomaculatum* Friese mit dem Typus von *A. auritum* Klg. festzustellen.

A. denticulatum sp.n. — Diese durch so viele auffallende Merkmale ausgezeichnete Art wurde nicht in den Bestimmungsschlüssel aufgenommen; da nur ein Geschlecht vorliegt.

Wie ich nachträglich von Freund Bischoff erfahre, besitzen die ♀ von *A. cucullatum* Friese auch die seitlich gezähnten Rückenplatten des Hinterleibs und die buckelförmig hervortretende, längsgekielte 1. Bauchplatte. Es ist daher höchstwahrscheinlich, dass *A. denticulatum* sp.n. nur als Varietät von *A. cucullatum* Fr. anzuschen ist.

Séance du 21 Juin 1932

Présidence de S.E. le Dr. Mohamed Shahine Pacha, *Président.*

Dons d'ouvrages :

La Société a reçu pour sa Bibliothèque les publications suivantes :

1° De Monsieur le Dr. Ezekiel Rivnay, de Tel Aviv (Palestine) : cinq brochures de ses travaux entomologiques.

2° De Monsieur W. J. Hall, de Mazoe (Rhodésie du Sud) : un tiré à part de son travail, « *Some Aphidæ of Southern Rhodesia with descriptions of five apparently new species* », extrait de Stylops (A Journal of Taxonomic Entomology), Vol. I, p. 3, 1932.

Le Conseil remercie.

Centenaire de la Société Entomologique de France et Vème Congrès International d'Entomologie (Paris, Juillet 1932) :

Le Conseil d'Administration désigne son Secrétaire Général, Monsieur A. Alfieri, pour y représenter la Société.

Secrétariat et Trésorerie :

En l'absence de Monsieur Richard Wilkinson, trésorier, et de Monsieur A. Alfieri, secrétaire général, Monsieur Edgard Chakour a bien voulu se charger de l'intérimat de leurs fonctions respectives.

Nominations :

Sur la proposition de Messieurs le Dr. H. Priesner et A. Alfieri, Monsieur le Dr. J. D. Alfken est élu membre correspondant. Monsieur le Dr. Saadallah Mohamed Madwar, proposé par S.E. le Dr. Mohamed Shahine Pacha et Monsieur A. Alfieri, est admis à faire partie de la Société au titre de Membre titulaire.

Echange des Publications :

Se fait inscrire l'Institut Agronomique de l'Etat a Gembloux (Bulletin de l'Institut Agronomique et des Stations de Recherches de Gembloux), Belgique.

Communications

New species of the genus *Thrips* from Central Africa and Egypt

(with Plates III - XI) [1]

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The Thysanoptera described in the following pages were collected principally by Mr. Arthur W. J. Pomeroy while an officer of the British Expeditionary Force in the Cameroons, Southern Nigeria, and East Africa (Tanganyika) in 1915 and 1916. One species, from Egypt, was taken about ten years later by Dr. C. B. Williams during his service with the Egyptian Ministry of Agriculture.

I wish particularly to acknowledge my indebtedness to Dr. Hermann Priesner, whose intimate familiarity with the European species of this genus has allowed him to review my determinations of these African ones with signal profit to myself, and whose manuscript key to the species known from the African mainland I have been permitted to translate into English for inclusion in this paper. His key I have edited to some extent, principally by the incorporation of additional characters.

A second key, in which other criteria have been used for the primary divisions of the genus and in which a different sequence of species has naturally resulted, is also included for the separation of the eight new species and the one new variety described.

The holotypes, allotypes, and all of the paratypes excepting one set which has been sent to Dr. Priesner, are in the collection of the writer.

It should be mentioned that one of the features most useful in the differentiation and definition of the species of this large and taxonomically difficult genus lies in the chaetotaxy of the abdominal sternites, and that this character has not heretofore been used except in the diagnosis of one North American species. Future descriptions in this genus should make reference to this character, which is the presence or absence of a series of accessory

(1) All of the Plates were most carefully drawn by Miss Helen Rearwin with the aid of a camera lucida, and have been checked in detail by the author.

setae across the middle of the sternites. Such setae are present in *T. physapus* Linné, *T. japonicus* Bagnall, *T. thalictri* Hood, and, no doubt, many others, in addition to certain of the new species now being described.

Unfortunately too few males are known to make worth while a key to the African species of that sex. Good characters, however, lie in the number and disposition of the glandular tympana on the sternites, and in the arrangement of the setae on tergite 9. These structures should in the future be more painstakingly described.

Finally, it should be added that in no group of insects are carefully executed, accurate illustrations of new forms more to be desired than in the Thysanoptera. No two workers agree exactly in their selection of structures to be described, and a good common denominator for the work of all would be illustrations of at least the head, prothorax, and antenna of every new species made known. If such drawings are not provided, I fear that the group will soon be in such a chaotic condition that worthwhile revisional or monographic work will be impossible.

Key to African Species (1).

Females.

I — Not only the eighth but also the preceding tergites with a comb composed of broad elements, distinct at least on the sides of segments 1 - 8 ..... Subgenus MICROCEPHALOTHRIPS Bagnall (2). One African species, from Egypt ..... **microcephalus Priesner.**

II — At most the eighth tergite with a comb, composed of fine hairlike teeth ..... Subgenus THRIPS Linné.

a. Head distinctly broader than length to anterior margin of eyes.

b. Principal vein of fore wing with 2 or 3 distal bristles, only exceptionally with 4 or 5 bristles.

c. Body color of female brown to black-brown, or yellow-brown, or at least the abdomen so, never clear yellow, *at least the tip of abdomen distinctly brownish.*

d. Head strongly narrowed behind, cheeks usually straight.

e. Sides of head toothed, each tooth (particularly anteriorly) with a distinct bristle, the head above strongly transversely striate as a result; bristles

(1) Based upon a manuscript key sent to me by Dr. Hermann Priesner
(2) Probably a valid genus, and so considered by some students of the group [J.D.H.].

on posterior angles of prothorax short, between them 3 pairs of minor bristles.

f. Bristles on posterior angles of prothorax hardly more than one-fourth as long as prothorax. (Tanganyika) .... **kikuyuensis Trybom.**

ff. Bristles on posterior angles of prothorax one-sixteenth or one-twentieth as long as prothorax. (Tanganyika) ..... **kikuyuensis brevisetosus Trybom.**

ee. Sides of head not or indistinctly toothed, always without bristles.

g. Segment 7 of antenna slightly more than one-third the length of 6; posterior margin of pronotum normally with three pairs of bristles between the two long pairs at posterior angles.

h. Segment 6 of antenna yellowish at base ..... **physapus Linné.**

hh. Segments 4 - 7 of antenna entirely dark; antennæ very slender; basal tergites without trace of teeth at sides. (S. Nigeria) .... cf. **exilicornis Hood.**

gg. Segment 7 of antenna about one-fourth the length of 6; posterior margin of pronotum normally with 5 pairs of bristles between the two long pairs at posterior angles. (Kalahari) .... **acaciæ Trybom.** ..... cf. **hirtiventris Hood.**

dd. Head with sides swollen or, when straight, the head not or little narrowed posteriorly.

i. Pronotum with 4 - 5 pairs of small bristles on posterior margin between the two large pairs at posterior angles.

j. Head about 1.1 times as broad as median dorsal length to extreme anterior margin of frontal costa; segment 3 of

antenna about 36 μ long; all body and wing bristles pale; normally 4 pairs of bristles on posterior margin of pronotum between the two long pairs at posterior angles; posterior vein of fore wing with 9 - 13 bristles. Egypt .... **quadrisetosus Hood.**

jj. Head about 1.25 times as broad as long; segment 3 of antenna more than 40 μ long; body and wing bristles dark; normally 5 pairs of bristles on posterior margin of pronotum; posterior vein of fore wing with about 16 bristles.

k. Segment 3 of antenna shorter than 6; eyes about as long as their distance from posterior margin of head; pronotum with bristles at posterior angles « long », and with about 25 pairs of smaller bristles; principal vein of fore wings with 3 or 4 bristles distally. (Kalahari) ..... **acaciæ Trybom.**

kk. Segment 3 of antenna longer than 6; eyes about 1.5 times as long as their distance from posterior margin of head; pronotum with bristles at posterior angles short (35 - 40 μ), and with about 50 pairs of smaller bristles; principal vein of fore wings with 2 or 3 bristles distally. (Tanganyika) ... **hirtiventris Hood.**

ii. Pronotum normally with 3 pairs of small bristles on posterior margin between the two large pairs at posterior angles.

l. Body uniform dark brown or gray brown.

m. Antennae 300 - 310 μ long, the third segment clear pale yellow; pronotum sparingly spinose with longer bristles; posterior vein with about 14 bristles. (S. Nigeria) .... **exilicornis Hood.**

mm. Antennæ not more than 270 μ long, the third segment clouded; pronotum more thickly spinose with short bristles; posterior vein with 15 - 17 bristles.

n. Antennæ about 218 μ long; segment 3 of antenna 40 μ long, slightly shorter than 6. (Tanganyika) .... **kikuyuensis Trybom.**

nn. Antennæ 260 - 270 μ long; segment 3 of antenna about 50 μ long, longer than 6.

o. Bristles on posterior angles of pronotum 33 - 44 μ

long; middle and hind tibiæ blackish brown (Cameroons) ..... **spadix var. spadix Hood.**

oo. Bristles on posterior angles of pronotum 15 - 20 μ long; middle and hind tibiæ yellow. (Cameroons) ..... **spadix var. brevipes Hood.**

ll. Body not so colored; head and prothorax yellow or orange.

p. Abdomen entirely dark, anterior portions of body orange.

q. Antennæ long (330 μ), almost entirely dark; ovipositor very long (0.4 mm.) (Cameroons) ..... **priesneri Hood.**

qq. Antennæ shorter (260 μ), the first segment entirely pale, the second and third orange; ovipositor shorter (0.23 mm.) (Cameroons) **aurantithoracis Hood.**

pp. Abdomen with only the last two tergites brownish, the preceding ones each with a dark median blotch; remainder of body clear yellow; segment 1 of antenna whitish. (S. Nigeria) ..... **meliæfloris Hood.**

cc. Body color of female clear yellow (if clouded at middle of tergites, then the *tip of abdomen pale*).

r. Antennal segments 5 - 7 entirely dark (Natal) ..... **tenellus Trybom.**

rr. Antennal segment 5 pale at least at base. (Egypt) ..... **microchætus Karny.**

bb. Principal vein of fore wing as a rule with more than 3 distal bristles.

s. Body bristles entirely white; 5 distal bristles on principal vein of fore wing; wings clear. (Tunis) ..... **assimilis Bagnall.**

ss. Body bristles dark.

t. Tergite 8 with complete comb on posterior margin; third antennal segment about 50 μ long, 20 μ wide. (Tunis) ..... **obneri Karny.**

tt. Tergite 8 without comb; third antennal segment about 70 - 73 μ long, 19 μ wide. (Tanganyika) ..... **hispidipennis Hood.**

aa. Head (measuring to anterior margin of eyes) longer than broad or as long as broad; posterior margin of pronotum with four pairs of long bristles betwen the two long pairs at posterior angles.

u. Antennal segment 7 very slender, 42 μ long, 9 μ wide; posterior vein of fore wing with 15 - 16 bristles. (Sudan) ..... **longistylus Trybom.**

uu. Antennal segment 7 thickened at base, 13 - 14 μ long, 8 μ wide; posterior vein of fore wing with 9 - 13 bristles. — (Egypt) ..... cf. **quadrisetosus Hood.**

Synopsis of Species here described as New.

Females.

A—Anterior vein of fore wing with 8 - 10 bristles in distal half; comb on posterior margin of abdominal tergite 8 broadly interrupted at middle. (Body and fore wings dark brown; segment 3 of antenna 76 μ. long, 20 μ wide). (Tanganyika) ..... **hispidipennis Hood.**

AA—Anterior vein of fore wing with 2 - 3 bristles in distal half; comb on posterior margin of abdominal tergite 8 complete, i.e., not interrupted at middle.

a. Abdominal sternites 3 - 7 with a number of major bristles (8 - 24) across middle, in addition to the usual row of six bristles along extreme posterior margin; body color brown to blackish brown.

b. Posterior margin of pronotum typically with 4 - 5 pairs of small bristles between the two large pairs at posterior angles.

c. Sternites 3 - 7 with 8 or 10 accessory bristles in an irregular row across middle; pronotum ordinarily with 4 pairs of small bristles on posterior margin between the two large pairs at posterior angles; posterior vein of fore wings with about 10 bristles (9 - 13), their intervals greater than their lengths; body bristles pale brownish yellow; head about 1.1 times as broad as median dorsal length to extreme anterior margin of frontal costa; segment 3 of antenna about 36 μ long and 17 μ wide. (Egypt) ..... **quadrisetosus Hood.**

cc. Sternites 3 - 7 with 16 - 25 accessory bristles, disposed in two irregular rows across middle; pronotum ordinarily with 5 pairs of small bristles on posterior margin between the two large pairs at posterior angles; posterior vein of fore

wings with about 16 bristles, their intervals less than their lengths; body bristles dark brown; head about 1.25 times as broad as median dorsal length to extreme anterior margin of frontal costa; segment 3 of antenna about 50 μ long and 19 μ wide. (Tanganyika) .... **hirtiventris Hood.**

bb. Posterior margin of pronotum normally with three pairs of small bristles between the two large pairs at posterior angles.

d. Antennæ decidedly slender, segment 3 clear pale yellow, 3 and 6 each three times as long as wide; bristles at posterior angles of pronotum long, subequal, about 84 μ in length; pronotum with about 26 pairs of bristles, exclusive of those at posterior angles; ovipositor about 0.25 mm. long. (S. Nigeria) ..... **exilicornis Hood.**

dd. Antennæ of normal form, segment 3 brownish yellow, 3 and 6 each 2.6 times as long as wide; bristles at posterior angles of pronotum short, not more than 45 μ; pronotum with about 37 pairs of bristles, exclusive of those at posterior angles; ovipositor about 0.21 mm. long.

e. Bristles on posterior angles of pronotum moderately short, the inner pair about 44 μ, the outer pair about 33 μ; middle tibiæ about 106 μ long. 37 μ wide; fore tibiæ largely yellow, middle and hind tibiæ blackish brown. (Cameroons) **spadix var. spadix Hood.**

ee. Bristles on posterior angles of pronotum exceedingly short, the inner pair about 20 μ, the outer pair about 15 μ; middle tibiæ about 84 μ long, 33 μ wide; all tibiæ pale yellow. (Cameroons) ..... **spadix var. brevipes Hood.**

aa. Abdominal sternites 3-7 without accessory major bristles: body not dark brown, but with at least the head and thorax yellow or orange.

f. Abdomen dark brown, paler basally; thorax bright orange.

g. Ovipositor of moderate length (0.23 mm.); antennæ not particularly slender, segments 3 and 4 less than 2.5 times as long as broad; segment 1 pale yellow. (Cameroons) ..... **aurantithoracis Hood.**

gg. Ovipositor very long (0.38 - 0.40 m.m); antennæ very slender, segments 3 and 4 fully three times as long as

broad; segment 1 darkened with blackish brown. (Cameroons) ..... **priesneri Hood.**

ff. Abdomen yellow, with segments 9 and 10, and median portions of tergites 1 - 8, brown; segment 3 of antenna about 57 μ long and 18 μ wide. (S. Nigeria) ..... **meliæfloris Hood.**

The following tabulation gives the lengths of the distal abdominal tergites of the new forms described. The measurements were made along the median line, excepting in the case of segment 10, where the greatest longitudinal length was taken.

Lengths of Tergites of Females, in Microns.

(Exclusion of comb on tergite 8.)

SPECIES	TERGITE				SPECIMEN
	7	8	9	10	
T. hispidipennis	96	95	100	58	Holotype
T. quadrisetosus	65	65	42	62	Paratype
T. hirtiventris	72	65	45	72	Holotype
T. exilicornis	84	76	64	80	»
T. spadix spadix	70	74	46	74	Paratype
T. spadix brevipes	74	67	46	66	Holotype
T. aurantithoracis	72	78	74	60	»
T. priesneri	88	109	109	104	»
T. meliæfloris	70	74	68	60	»

Thrips hispidipennis sp.nov.

(Pl. III, figs. 1-5).

Female (macropterous). — Length about 1.5 mm. Color nearly uniform dark brown, with head and tip of abdomen slightly darker and thorax with underlying orange pigmentation; legs dark brown, with fore femora and fore tibiæ largely yellow, and tips of mid and hind tibiæ and all tarsi, clear yellow; fore wings uniform dark brown save for a small white area beyond scale; antennæ concolorous with head in segments 1 and 2, segment 3 pale yellowish at base shading to brownish gray in distal half or more, 4 and 5 slightly darker, brownish gray excepting the yellowish basal fourth or fifth, 6 and 7 brownish gray, the distal two-fifths of 6 and all of 7 somewhat paler; body and wing bristles dark blackish brown; ocellar pigmentation orange-red.

Head (Pl. III, fig. 1) about 1.22 times as broad across eyes as median dorsal length, about 0.88 as long as pronotum, hardly as broad across cheeks as across eyes, the transverse anastomosing lines *close*, *numerous*, dark, distinct, and forming deep serræ along the cheeks; cheeks somewhat swollen; vertex hollowed in front of ocelli, not at all forming an overhanging elevation

but sloping nearly evenly from ocelli to frontal costa, this last very narrow and only slightly notched; interocellar bristles situated on lines tangent to the outer margins of anterior and posterior ocelli, about comparable with median pair on posterior margin of pronotum, distinctly longer than the slightly more widely-spaced postocellars, the last a bit longer than postoculars; ventral surface of head with the two pairs of long bristles near bases of antennæ, the inner pair much the longer and reaching beyond apex of first antennal segment. Eyes large, about 0.63 as long as head and more than 0.9 as wide as their interval, protruding, pilose as usual. Ocelli about opposite middle of eyes. Antennæ (Pl. III, fig. 2) hardly 2.5 times the length of head, unusually slender, segment 3 about 3.8 times as long as wide and 1.2 times as long as 6, the latter 3.2 times as long as wide and 2.5 times as long as 7. Maxillary palpi three-segmented as usual, the segments measuring 18 μ, 13 μ, and 22 μ, respectively.

Prothorax about 1.53 times as wide as median dorsal length, with distinct, dark, equally-spaced lines of sculpture on notum, sides subparallel and only slightly rounded; bristles at posterior angles long and strong, slightly curved, the inner pair about 92 μ long, the outer pair about 100 μ long; posterior margin with three pairs of bristles, the inner pair longer and stouter than the others and about comparable with the midlaterals; other bristles on pronotum disposed in about 24 pairs, rather short and weak, excepting a pair near anterior margin at lateral third about equal to interocellars. Wings of fore pair (Pl. III, fig. 3) with about 30 bristles on costal margin, 7 or 8 (usually 4 + 3) at base of anterior vein and normally *9 or 10 in distal half*, and usually 15 on posterior vein.

Abdomen rather broad; *tergite 8 with comb on posterior margin broadly interrupted* and visible only on sides (Pl. III, fig. 4); posterior margin of tergite 9 with bristles of inner pair 134 μ long, outer pair 150 μ, lateral pair 140 μ; tergite 10 with bristles of inner pair 136 μ, outer pair 128 μ; sternites with the usual three pairs of long bristles on extreme posterior margin and with *two pairs of small accessory bristles on sides of intermediate tergites* (Pl. III, fig. 5).

Measurements of ♀ (holotype): Length 1.46 mm.; head, length 0.144 mm., width across eyes 0.176 mm., width just behind eyes 0.165 mm., width across cheeks 0.173 mm.; eyes, length 0.090 mm., width 0.058 mm., interval 0.060 mm.; pronotum, length 0.162 mm., width 0.248 mm., length of outer bristles at posterior angles 0.100 mm., length of inner ones 0.092 mm.; pterothorax, greatest width 0.345 mm.; fore wing, length 0.953 mm.; abdomen, greatest width 0.390 mm.

Antennal segments :	1	2	3	4	5	6	7
Length (μ):	32	48	76	67	48	64	22
Width (μ):	33	30	20	20	18	20	8

Total length of antenna 0.357 mm.

Male (macropterous). — Length about 1.2 mm. Color and structure much as in female. Sternites 3 - 7 with transversely elliptical tympana, that on 3 about nine times as wide as long; tergite 9 with two pairs of bristles in a nearly straight line slightly behind middle, and a third pair cephalad and laterad of the outermost of these, the median pair much stronger than and two or three times as long as, the others.

Measurements of allotype (♂) : Length 1.19 mm ; head, length 0.149 mm., width across eyes 0.167 mm., width just behind eyes 0.158 mm., width across cheeks 0.170 mm.; eyes, length 0.088 mm., width 0.055 mm., interval 0.058 mm.; pronotum, length 0.140 mm., width 0.226 mm., length of outer bristles at posterior angles 0.096 mm., length of inner ones 0.092 mm.; pterothorax, greatest width 0.300 mm.; fore wings, length 0.832 mm.; abdomen, greatest width 0.233 mm.

Antennal segments:	1	2	3	4	5	6	7
Length (μ):	28	44	77	68	48	62	20
Width (μ):	32	29	18	18	18	20	8

Total length of antenna 0.347 mm.

Described from 5 females and 8 males taken at Dar-es-Salâm, Tanganyika Territory, December 14, 1916, by Arthur W. J. Pomeroy, in "flowers of Jasmine" [Hood No. 182].

Thrips quadrisetosus sp.nov.

(Pl. IV, figs. 1-5.)

Female (macropterous). — Length about 0.92 mm. Color dark blackish brown, with fore tibiæ (except along outer and inner surfaces), extreme tips of mid and hind tibiæ, and all tarsi, yellowish; wings of fore pair pale grayish brown, veins slightly darker; antennæ with segments 1, 2, and 5 - 7 blackish brown, 2 yellowish apically, and 3 brownish yellow, with pale pedicel; body and wing bristles pale, yellowish; ocellar pigmentation orange-red.

Head (Pl. IV, fig. 1) long and narrow, about 1.16 times as wide as median dorsal length, about 0.9 as long as pronotum, broadest near base, the transverse anastomosing lines dark, only moderately distinct, widely spaced; cheeks nearly straight, converging to eyes; vertex flattened, slightly depressed in front of ocelli, not forming an overhanging angulation, but sloping nearly evenly to frontal costa, this last narrow and shallowly notched; interocellar and postocellar bristles subequal, longer than postoculars, the former somewhat more widely spaced than the latter and situated just outside lines tangent to the outer margins of anterior and posterior ocelli; ventral surface of head with the two pairs of bristles near bases of antennæ rather short, the inner

pair longer than the outer but not attaining tip of first antennal segment. Eyes about 0.5 as long as head about 0.87 as wide as their interval, not protruding, pilose as usual. Ocelli posterior in position, the hind margins of posterior ocelli only slightly in advance of posterior margin of eyes. Antennæ (Pl. IV, fig. 2) short and somewhat stout, about 2.1 times as long as head, segment 3 short, about 2.1 times as long as wide and slightly shorter than 6, the latter 2.33 times as long as wide and 2.8 times as long as 7. Maxillary palpi short, the segments measuring 8 μ, 5 μ, and 10 μ respectively.

Prothorax about 1.36 times as wide as median dorsal length, almost devoid of sculpture on notum, sides very gently rounded, nearly parallel; *bristles at posterior angles short, the outer pair about 48 μ long, the inner pair about 36 μ long; posterior margin with four pairs of subequal bristles*, or the innermost pair stronger; other pronotal bristles hardly as long as those on posterior margin, disposed in about 20 pairs. Wings of fore pair (Pl. IV, fig. 3) with about 21 bristles on costal margin, 4 + 3 at base of anterior vein and 1 + 1 + 1 (the last two closer together) in distal third, and about 10 (9-13) on posterior vein, wing bristles short, the intervals between those on posterior vein greater than lengths. Legs short and moderately stout.

Abdomen of moderate width; *tergite 8 with a complete comb of long (14 μ) teeth on posterior margin* (Pl. IV, fig. 5); posterior margin of tergite 9 with bristles of inner pair about 73 μ long, outer pair 92 μ, and lateral pair 76 μ; tergite 10 with inner bristles 84 μ and outer ones 80 μ; *sternites with about five pairs of accessory bristles in an irregular single row across middle*, in addition to the usual three pairs of longer bristles on extreme posterior margin (Pl. IV, fig. 4); *ovipositor about 0.17 mm. long.*

Measurements of holotype (♀): Length 0.918 mm.; head, length 0.100 mm., greatest width (near base) 0.116 mm., width across eyes 0.110 mm.; least width (just behind eyes) 0.109 mm.; eyes, length 0.051 mm., width 0.035 mm., interval 0.040 mm.; prothorax, length 0.110 mm., width 0.150 mm., length of outer bristles at posterior angles 0.048 mm., length of inner ones 0.036 mm.; pterothorax, greatest width 0.203 mm.; fore wings, length 0.605 mm.; abdomen, greatest width 0.236 mm.; ovipositor, length 0.169 mm.

Antennal segments:	1	2	3	4	5	6	7
Length (μ):	23	32	36	32	30	42	15
Width (μ):	24	19	17	17	17	18	9

Total length of antenna 0.210 mm.

Described from 9 females taken "on Yellow Marigold", Behig, Egypt, March 23, 1925, by C. B. Williams [Hood No. 430].

Dr. Priesner says of this species (in litt.), "sehr ähnlich *tenuisetosus* Knechtel, aber kleiner, Hintereckenborsten des Prothorax deutlich kürzer!"

Knechtel's species, described and known only from Rumania, measures about 1.1 mm. in length and has the bristles at the posterior angles of the pronotum 60 - 64 μ long; *quadrisetosus* averages about 0.92 mm. and the prothoracic bristles are not more than 48 μ long. Another difference lies in the length of the ovipositor, which is said to be 0.25 to 0.26 mm. long in *tenuisetosus* but which in the present species measures only 0.17 mm. Knechtel unfortunately makes no mention of accessory abdominal setæ in the description of his species.

Thrips hirtiventris sp.nov.

(Pl. V, figs. 1-5).

Female (macropterous). — Length about 1.1 mm. Color nearly uniform dark blackish brown, pterothorax with a slight orange cast due to underlying pigmentation; legs dark blackish brown; fore femora paler, particularly at apex, which is yellow; fore tibiæ yellow, little if at all darkened along outer surface; tarsi yellow; wings of fore pair dark grayish brown, irregularly paler in basal fourth between veins, and with an elongate clear spot beyond scale behind the longitudinal vein; antennæ brownish gray, with a distinct yellowish cast, throughout their length much paler than head, segment 2 yellowish apically and at middle, 3 lightly brownish yellow and somewhat shaded apically at sides, 4 pale at base but considerably shaded in apical half, 5 pale in basal half or three-fifths, its apical portion rather more abruptly and deeply darkened than 4, 6 and 7 nearly blackish brown, the former decidedly yellowish basally; body and wing bristles blackish brown; ocellar pigmentation orange-red.

Head (Pl. V, fig. 1) about 1.25 times as wide as median dorsal length, about 0.85 as long as pronotum, broadest across anterior portion of cheeks, the transverse anastomosing lines dark and distinct, producing a moderate serration of the cheeks which is more distinct anteriorly; cheeks rounded, converging to base of head, which is about 0.9 the greatest width across cheeks; vertex flattened, not forming an overhanging angulation, but sloping nearly evenly to frontal costa, this last shallowly notched at less than ninety degrees; interocellar bristles situated directly laterad of median ocellus and directly cephalad of middle of posterior ocelli, about equal to the slightly less widely spaced post-ocellars and to the pair at middle of posterior margin of pronotum; ventral surface of head with the inner of the two long pairs of bristles near bases of antennae about 35 μ long and 1.5 times as long as the outer. Eyes nearly 0.6 as long as head and nearly 0.8 as wide as their interval, scarcely protruding, pilose as usual. Ocelli distinctly in rear of middle line of eyes, the hind margins of posterior ocelli about as far in front of posterior margin of eyes as the diameter of ocelli, and the front margin of anterior ocellus about twice that far behind anterior margin of eyes. Antennæ (Pl. V,

fig. 2) of normal form and structure, about 2.15 times as long as head, segment 3 about 2.25 times as long as wide and somewhat longer than 6, the latter about 2.4 times as long as wide and about 3.3 times as long as 7. Maxillary palpi with the segments measuring about 8 μ, 6 μ, and 13 μ, respectively ; last segment of labial palpus subequal to last segment of maxillary palpus.

Prothorax about 1.44 times as wide as median dorsal length, with distinct, equally-spaced lines of sculpture on notum, sides somewhat rounded and very slightly converging anteriorly ; bristles on posterior angles short and stout, slightly curved, the inner pair about 39 μ long, the outer pair about 35 μ long ; *posterior margin usually with five pairs of bristles*, the inner pair (as usual) longer and stouter than the others, equal to midlaterals ; other bristles on pronotum smaller, *more numerous than usual* (*about 44 pairs*), scattered rather evenly over the surface save for the bare circular depression (muscle attachment) on either side of the median line posteriorly and the bare groove running across the pronotum just in front of its posterior margin. Wings of fore pair (Pl. V, fig. 3) with about 30 bristles on costal margin, 4 + 3 at base of anterior vein and 1+1+1 beyond (the first often wanting, the last two close together), and usually 17 or 18 on posterior vein, these longer than their intervals.

Abdomen of moderate width ; *tergite 8 with complete comb of short teeth on posterior margin* (Pl. V, fig. 5) ; posterior margin of tergite 9 with bristles of inner pair 58 μ long, outer 68 μ, lateral 71 ; tergite 10 with bristles of inner and outer pairs subequal, about 74 μ long ; sternites with the usual three pairs of long bristles on posterior margin and *with 8 - 12 pairs of accessory bristles arranged in two irregular rows across middle* (Pl. V, fig 4) ; ovipositor about 0.21 mm. long.

Measurements of paratype (♀) : Length 1.14 mm. ; head, length 0.109 mm., width across cheeks 0.137 mm., width across eyes 0.132 mm., width just behind eyes 0.127 mm., width at base 0.122 mm. ; eyes, length 0.062 mm., width 0.040 mm., interval 0.052 mm. ; pronotum, length 0.128 mm., width 0.185 mm., length of outer bristles at posterior angles 0.035 mm., length of inner ones 0.039 mm. ; pterothorax, greatest width 0.233 mm. ; fore wings, length 0.608 mm. ; abdomen, greatest width 0.245 mm. ; ovipositor, length 0.210 mm.

Antennal segments :	1	2	3	4	5	6	7
Length (μ) :	22	36	45	42	33	43	13
Width (μ) :	24	23	20	19	17	18	7

Total length of antenna 0.234 mm.

Male (macropterous). — Length about 0.8 mm. Color nearly uniform

straw-yellow, with the extreme tips of antennal segments 4 and 5, the distal half of 6, and all of 7 darkened with brownish gray; fore wings with a slight yellowish tinge; body and wing bristles pale yellowish brown, not conspicuous; ocellar pigmentation bright orange-red.

Head about 1.22 times as wide as median dorsal length and subequal in length to pronotum, shaped as in female except that it is a trifle broader across the eyes than across the cheeks. Eyes and ocelli about as in female. Antennæ with segment 3 about 2.4 times as long as wide and usually distinctly shorter than 6, the latter nearly three times as long as wide and about four times as long as 7.

Prothorax about 1.5 times as wide as long and with the lines of sculpture very faint; inner bristles on posterior angles about 30 μ, outer 21 μ; other pronotal bristles paler and very indistinct, those on posterior margin numbering 4 or 5 pairs. Wings of fore pair structurally as in female, except that there are about 26 pale costal bristles and 14 similarly pale ones on posterior vein.

Abdomen slender; tergite 9 with a nearly straight transverse row of four equally-spaced bristles (20 or 21 μ) across posterior third, the third pair of bristles very minute and more lateral and basal in position; sternites 3-7 with transversely elliptical tympana.

Measurements of allotype (♂): Length 0.788 mm.; head, length 0.097 mm., width across cheeks 0.118 mm., width across eyes 0.119 mm., width just behind eyes 0.112 mm., width at base 0.105 mm.; eyes, length 0.057 mm., width 0.036 mm., interval 0.048 mm.; pronotum, length 0.098 mm., width 0.147 mm., length of outer bristles at posterior angles 0.021 mm., length of inner ones 0.030 mm.; pterothorax, greatest width 0.184 mm.; fore wings, length 0.480 mm.; abdomen, greatest width 0.140 mm.

Antennal segments:	1	2	3	4	5	6	7
Length (μ):	20	—	41	37	32	49	12
Width (μ):	22	21	17	17	16	17	7

Described from 37 females and 2 males, all taken in the region of the Rufiji River in East Africa (Tanganyika), by Arthur W.J. Pomeroy, as enumerated below :

July 16, 1917, "in catkins of False Ebony," 18 ♀♀, 2 ♂♂ [Hood No. 184], *holotype*, *allotype*, and *paratypes*.

July 27, 1917, "in flowers of False Ebony," 3 ♀♀ [Hood No. 188], *paratypes*.

July 31, 1917, "in flowers of a tree," 16 ♀♀ [Hood No. 190], *paratypes*.

There is perhaps little point in comparing this species with *kikuyuensis*, which differs markedly in possessing three pairs only of bristles on the posterior margin of the pronotum between the two long pairs at the hind angles; but with *acaciæ* Trybom, described from Kalahari, it has many features in common. That species I have not seen; but, judging from Trybom's description and drawings *hirtiventris* differs in that (1) the third antennal segment is invariably longer than the sixth instead of shorter, (2) the length of the eyes is nearly or quite 1.5 times their distance from the posterior margin of the head, instead of « etwa so lang wie der Abstand zwischen ihrem Hinterrande und dem Hinterrande des Kopfes », (3) the bristles at the hind angles of the pronotum are certainly not « länger » or as long as figured for *acaciæ*, (4) the pronotum is much more abundantly setose, and (5) the fore wings have in the distal portion of the median vein either 2 or 3 bristles (averaging 2.57 in 68 wings examined), instead of 3 (never 2) with the innermost sometimes replaced by 2 (and Trybom studied 426 females !). It should be noted that Trybom's figure disagrees with his description in that the head is pictured as broader across the eyes than across the cheeks.

Thrips exilicornis sp.nov.

(Pl. VI, figs. 1-5.)

Female (macropterous). — Length about 1.24 mm. Color dark blackish brown, with underlying orange pigmentation in thorax; coxæ concolorous with body, all trochanters, extreme bases of all femora (sometimes also the extreme tips of fore femora), fore tibiæ except narrowly along outer surface, usually both ends of mid and hind tibiæ, and all tarsi, clear lemon-yellow; wings of fore pair rather dark grayish brown, paler in basal fourth and narrowly in distal four-fifths between the two veins; antennæ dark blackish brown, paler in apical portion of segment 2, segment 3 nearly clear pale yellow, segments 4 and 5 with a narrow pale ring just beyond pedicel, 6 slightly paler apically, 7 concolorous with apex of 6; body and wing bristles blackish brown; ocellar pigmentation orange-red.

Head (Pl. VI, fig. 1) broad, about 1.5 times as wide as median dorsal length, about 0.75 as long as pronotum, broadest across anterior portion of cheeks, the transverse anastomosing lines dark and distinct, producing a deep serration of the anterior half of cheeks; cheeks converging abruptly to base of head, prominent and bulging just behind eyes, nearly straight posteriorly; vertex flattened, not forming an overhanging angulation, but sloping nearly evenly to frontal costa, this last narrowly and shallowly notched; interocellar bristles situated directly opposite posterior margin of median ocellus and just outside lines tangent to the outer margins of median and posterior ocelli, somewhat longer, stronger, and closer together than post-ocellars, about equal to the pair at middle of posterior margin of pronotum; ventral surface of head

with the two pairs of bristles near bases of antennæ, the outer pair (40 μ) about attaining tip of first antennal segment, the inner pair longer (56 μ) and reaching to basal third of the second antennal segment. Eyes about 0.63 as long as head and about 0.8 as wide as their interval, somewhat protruding because of the constriction behind them, pilose as usual. Ocelli somewhat in advance of middle line of eyes, the hind margins of posterior ocelli as far in front of posterior margins of eyes as the diameter of the ocelli. Antennæ (Pl. VI, fig. 2) decidedly slender, about 2.92 times as long as head, segment 3 elongate, about three times as long as wide and very slightly longer than 6, the latter fully three times as long as wide and fully three times as long as 7.

Prothorax about 1.5 times as wide as median dorsal length, with distinct, dark, equally spaced lines of sculpture on notum, sides rounded, scarcely converging anteriorly; bristles on posterior angles long, strong, subequal, slightly curved, and about 84 μ in length; posterior margin with three pairs of bristles, the inner pair longer and stouter than the others, equal to midlaterals; other bristles on pronotum smaller, disposed in about 23 pairs. Wings of fore pair (Pl. VI, fig 4) with about 29 pairs on costal margin, 4 + 3 at base of anterior vein and 1 + 1 + 1 beyond (the last two closer together), and about 14 on posterior vein, these last longer than their intervals.

Abdomen of moderate width; *tergite 8 with complete comb of short teeth on posterior margin* (Pl. VI, fig. 5); posterior margin of tergite 9 with bristles of inner pair 90 μ long, outer pair 124 μ, lateral pair 114 μ; tergite 10 with bristles of inner pair 107 μ, outer pair 96 μ; sternites with the usual three pairs of long bristles on extreme posterior margin and *with about 6 (5-7) pairs of accessory bristles arranged in a nearly regular transverse row* (Pl. VI, fig 3), ovipositor about 250 μ long.

Measurements of holotype (♀): Length 1.24 mm.; head, length 0.104 mm., width across eyes 0.156 mm., width across cheeks 0.158 mm., width just behind eyes 0.148 mm., width at base 0.136 mm.; eyes, length 0.065 mm., width 0.048 mm., interval 0.060 mm.; pronotum, length 0.140 mm., width 0.211 mm., length of outer bristles at posterior angles 0.084 mm., of inner ones 0.084 mm.; pterothorax, width 0.273 mm.; fore wings, length 0.762 mm.; abdomen, width 0.320 mm.; ovipositor, length 0.250 mm.

Antennal segments:	1	2	3	4	5	6	7
Length (μ):	27	42	60	57	43	57	18
Width (μ):	31	26	20	19	17	18	7

Total length of antenna 0.304 mm.

Described from 9 females taken by Arthur W. J. Pomeroy at Ibandan, S. Nigeria, January 14, 1915, in flowers of *Melia azedarach* [Hood No. 53].

A readily-known species, distinguishable by the abruptly pale third anten-

nal segment, posteriorly narrowed head, and the number and arrangement of the accessory abdominal setæ

Thrips spadix sp.nov.

(Pl. VII, figs. 1-5.)

Female (macropterous). — Length about 1.2 mm. Color nearly uniform dark blackish brown, pterothorax with a slight orange cast due to underlying pigmentation; legs dark blackish brown, fore femora sometimes narrowly yellowish at apex, fore tibiæ largely yellow but darkened along outer surface, tarsi yellow; wings of fore pair dark grayish brown, darkest in second fourth, irregularly paler in basal fourth between veins, and with an elongate clear spot beyond scale behind the longitudinal vein; antennæ dark blackish brown, usually paler in apical portion of segment 2, segment 3 lightest, pedicel nearly colorless, dark at tip, 4 and 5 usually with a narrow pale ring just beyond pedicel but sometimes slightly paler in whole basal region, 6 usually slightly paler apically, 7 concolorous with apex of 6; body and wing bristles blackish brown; ocellar pigmentation orange-red.

Head (Pl. VII, fig. 1) moderately slender, about 1.2-1.3 times as wide as median dorsal length, about 0.8 as long as pronotum, broadest across anterior portion of cheeks, the transverse anastomosing lines moderately dark and distinct, producing a deep serration of the cheeks; cheeks converging to base of head, slightly prominent and bulging just behind eyes, nearly straight posteriorly; vertex flattened, not forming an overhanging angulation, but sloping nearly evenly to frontal costa, this last narrowly notched; interocellar bristles slightly larger than the more closely-spaced postocellars, about equal to the pair at middle of posterior margin of pronotum, situated directly lateral of median ocellus and slightly outside lines tangent to outer margins of median and posterior ocelli; ventral surface of head with the inner of the two long pairs of bristles near bases of antennæ much longer than the outer pair (about 48 μ and 30 μ, respectively). Eyes about 0.6 as long as head and about 0.8 as wide as their interval, somewhat protruding because of the constriction behind them, pilose as usual. Ocelli distinctly in rear of middle line of eyes, the hind margins of posterior ocelli about as far in front of posterior margins of eyes as the diameter of ocelli, and the front margin of anterior ocellus about twice that far behind anterior margins of eyes. Antennæ (Pl. VII, fig. 2) of normal form and structure, about 2.13 times as long as head, segment 3 about 2.6 times as long as wide and somewhat longer than 6, the latter about 2.6 times as long as wide and about 3.3 times as long as 7.

Prothorax about 1.28 times as wide as median dorsal length, with distinct, equally-spaced lines of sculpture on notum, sides rounded but distinctly converging anteriorly; bristles on posterior angles short and stout, slightly curved,

the inner pair about 44 μ long, the outer pair about 31 μ; posterior margin with three pairs of bristles, the inner pair longer and stouter than the others, equal to midlaterals; other bristles on pronotum smaller, disposed in about 34 pairs. Wings of fore pair (Pl. VII, fig 3) with about 29 stout bristles on costal margin, 4 + 3 (or 4 + 4) at base of anterior vein and 1 + 1 + 1 beyond (the last two closer together), and about 17 (14-17) on posterior vein, these last longer than their intervals. Middle tibiæ not especially short or stout, measuring about 106 μ in length and 37 μ in width.

Abdomen of moderate width; *tergite 8 with complete comb of short teeth on posterior margin* (Pl. VII, fig. 5); posterior margin of tergite 9 with bristles of inner pair 72 μ long, outer pair 84 μ, lateral pair 80 μ; tergite 10 with bristles of inner and outer pairs subequal, about 84 μ; sternites with the usual three pairs of long bristles on posterior margin and *with 7-12 pairs of accessory bristles arranged in a nearly regular transverse row if few in number or in two irregular rows if numerous* (Pl. VII, fig. 4); ovipositor about 0.212 mm. long.

Measurements of holotype (♀) : Length 1.23 mm.; head, 0.126 mm., width across eyes 0.150 mm., width across cheeks 0.154 mm., width just behind eyes 0.144 mm., width at base 0.132 mm.; eyes, length 0.074 mm., width 0.046 mm., interval 0.058 mm.; pronotum, length 0.156 mm., width 0.200 mm., length of outer bristles at posterior angles 0.031 mm., of inner ones 0.044 mm.; pterothorax, width 0.272 mm.; fore wings, length 0.720 mm.; abdomen, width 0.291 mm.; ovipositor, length 0.212 mm.

Antennal segments:	1	2	3	4	5	6	7
Length (μ):	28	40	54	47	36	49	15
Width (μ):	28	26	21	21	19	19	7

Total length of antenna 0.269 mm.

Male (macropterous). — Length about 0.84 mm. Color straw-yellow; legs concolorous with body; fore and hind wings almost colorless, with a slight yellowish tinge; antennæ with segments 1 and 2 nearly colorless, 3 nearly colorless in pedicel, yellowish beyond, infuscate laterally and apically, 4 yellowish in basal portion, shading to yellowish gray apically, 5 yellowish gray, with a pale ring just beyond pedicel and darkest apically, 6 and 7 yellowish gray, the former paler basally; body and wing bristles yellowish brown, conspicuous because of their dark color; ocellar pigmentation reddish orange.

Head about 1.2 times as wide as median dorsal length and about 0.9 as long as pronotum, shaped as in female. Eyes about 0.6 as long as head and nearly 0.9 as wide as their interval. Ocelli as in female, except that the distance from anterior ocellus to line of front of eyes is about 1.5 times the diameter of posterior ocellus. Antennæ about 2.11 times as long as head, segment 3

about 2.2 times as long as wide and somewhat *shorter* than 6, the latter about 2.5 times as long as wide and about 3.1 times as long as 7.

Prothorax much as in female but 1.46 times as long as median dorsal length, with the sides scarcely converging anteriorly, and the bristles at posterior angles shorter, the inner pair about 35 μ long, the outer pair 17 μ. Wings of fore pair with about 25 costal bristles, anterior vein bristled as in female, posterior vein with 11 or 12 bristles.

Abdomen slender; tergite 9 with a nearly straight transverse row of four equally-spaced bristles (20 or 21 μ) across posterior third, the third pair of bristles very minute and more lateral and basal in position; sternites 3 - 7 with transversely elliptical typana.

Measurements of allotype (♂): Length 0.840 mm.; head, length 0.109 mm., width across eyes 0.129 mm., width across cheeks 0.131 mm., width just behind eyes 0.123 mm., width at base 0.118 mm.; eyes, length 0.064 mm., width 0.041 mm., interval 0.047 mm.; pronotum, length 0.119 mm., width 0.174 mm., length of outer bristles at posterior angles 0.017 mm., of inner ones 0.035 mm.; pterothorax, width 0.220 mm.; fore wings, length 0.570 mm.; abdomen, width 0.171 mm.

Antennal segments:	1	2	3	4	5	6	7
Length (μ):	22	37	41	40	33	44	14
Width (μ):	25	23	19	18	17	18	7

Total length of antenna 0.231 mm.

Described from 16 females and 2 males, all taken by Arthur W. J. Pomeroy in the Cameroons, as listed below:

February 12, 1916, in flowers of a shrub, 6♀♀, 2♂♂ [Hood No. 174], *holotype*, *allotype*, and *paratypes*.

January 21, 1916, in flowers of a small weed, 1♀ [Hood No. 167], *paratype*.

December 10, 1915, in flowers of a small thistle, 9♀♀ [Hood No. 163], *paratypes*.

The extent of variation in the number of accessory setæ on the abdominal sternites of this species is very puzzling. Individuals living together on the same plant show both extremes of variation, and for this reason I do not believe that two species have been confused in my collection.

In many ways this suggests *T. kikuyuensis* Trybom, described from what is now Kenya Colony, where it was taken at an altitude of about 8,000 feet in *Eupatorium*-like flowers. Trybom's description is of a species with toothed cheeks (as seen from above), the teeth being produced by the deep transverse

striæ running across the posterior part of the head; and "die vorderen Zähne [sind] jeder mit einem kleinen Stachel versehen". These characters Dr. Priesner has utilized in the preceding key for the segregation of this species, which would thereby seem to be very distinct.

From Trybom's description of *kikuyuensis*, *spadix* differs constantly in having a much longer third antennal segment, — longer in comparison with segment 6 (which it always exceeds in length) and longer in microns (averaging more than 50 μ as against 40 μ in *kikuyuensis*). Furthermore, it would seem unlikely that *kikuyuensis* should occur in the low Cameroons on the opposite side of the continent.

Thrips spadix var. brevipes nov.

(Pl. VIII, figs. 1-5.)

Female (macropterous). — Length about 1.0 mm. Color as in the typical form, excepting as follows: Femora blackish brown along outer surface, the *inner surfaces usually pale yellow; all tibiæ and tarsi pale yellow.*

Structure as in the typical form excepting as noted: Head (Pl. VIII, fig. 1) about 1.4 times as wide as median dorsal length; eyes about 0.7 as wide as their interval; antennæ (Pl. VIII, fig. 2) about 2.3 times as long as head. Prothorax 1.33 - 1.38 times as wide as median dorsal length; *bristles on posterior angles exceedingly short, the inner and outer pairs measuring about 20 μ and 15 μ, respectively; middle tibiæ short and stout*, measuring about 84 μ in length and 33 μ in width. Tergite 9 with bristles of inner pair about 45 μ long, outer pair 53 μ, lateral pair 56 μ; tergite 10 with bristles of both pairs subequal, about 67 μ; ovipositor about 0.20 mm. long.

Measurements, ♀, principally of holotype: Length 1.0 mm.; head, length 0.103 mm.; width across eyes 0.132 mm., width just behind eyes 0.128 mm., width across cheeks 0.139 mm., width at base 0.123 mm.; eyes, length 0.056 mm., width 0.038 mm., interval 0.056 mm.; pronotum, length 0.132 mm., width 0.183 mm., length of outer bristles at posterior angles 0.012-0.015 mm., length of inner ones 0.018 - 0.020 mm.; pterothorax, greatest width 0.228 mm.; fore wings, length 0.635 mm.; middle tibia, length 0.084 mm., width 0.033 mm.; abdomen, greatest width 0.240 mm.

Antennal segments:	1	2	3	4	5	6	7
Length (μ):	24	39	47	40	32	43	13
Width (μ):	24	23	18	17	17	17	7

Total length of antenna 0.238 mm.

Male. — Unknown.

Described from 4 females taken by Arthur W. J. Pomeroy in the

Cameroons, December 10, 1915, in "flowers of a small thistle" [Hood No. 163], in company with 9 females of the typical form.

The characters given above in italics seem sufficient to justify the erection of a new variety.

Thrips aurantithoracis sp.nov.

(Pl. IX, figs. 1-5.)

Female (macropterous). — Length about 1.1 mm. Color of head yellow, nearly white at sides behind eyes, lightly washed with brownish across middle of occiput, cheeks darkened posteriorly and there underlaid with a little bright orange pigmentation; thorax yellow, with abundant bright orange pigmentation, pterothorax clouded with brown at sides and in front; abdomen blackish brown, distinctly paler basally and somewhat so distally, with slight orange pigmentation in segment 1 only; legs yellow, coxæ and femora with bright orange pigmentation, and, together with hind tibiæ, very lightly washed with gray; wings of fore pair dark blackish brown, nearly uniform in color save for a narrow white spot just behind median vein directly opposite the gap between the two subbasal groups of bristles; antennæ with segment 1 nearly colorless, 2 and 3 bright orange (because of the contained pigmentation) and concolorous with thorax, 3 darkened with gray apically and at sides, 4-7 dark grayish brown with a distinct yellowish cast, paler basally, 4 with a little orange pigmentation at base; body and wing bristles (excepting on paler portions of legs) dark blackish brown; ocellar pigmentation bright orange-red.

Head (Pl. IX, fig. 1) about 1.3 times as broad across eyes as median dorsal length, nearly 0.84 as long as pronotum, hardly as broad across cheeks as across eyes, the transverse lines dark and distinct, but not numerous or deep, not forming deep serræ along the cheeks; cheeks decidedly curved, somewhat converging posteriorly; vertex hollowed in front of ocelli, not forming an overhanging elevation but sloping nearly evenly downward from ocelli to frontal costa, this last very slightly notched; interocellar and postocellar bristles subequal and about comparable with the midlateral pair on pronotum, much longer, stronger, and darker than postoculars; interocellars situated very close to median ocellus, just within the ocellar triangle, the distance between them distinctly less than one-half the distance between postocellars; the pair of bristles near inner margins of eyes and in front of median ocellus large and conspicuous, nearly comparable with postocellars; ventral surface of head with the two pairs of long bristles near bases of antennæ, the inner pair much the longer (about 45 μ), considerably surpassing apex of first antennal segment. Eyes large, about 0.62 as long as head and about 0.74 as wide as their interval, somewhat protruding, pilose as usual. Ocelli distinctly behind middle of eyes, but with the distance from the hind margins of

posterior pair to line of hind margins of eyes fully equal to diameter of ocelli. Antennæ (Pl. IX, fig. 2) about 2.46 times the length of head, of normal shape and structure, segment 3 about 2.24 times as long as wide and equal in length to 6, the latter 2.47 times as long as wide and 2.6 times as long as 7. Maxillary palpi three-segmented, as usual.

Prothorax about 1.35 times as wide as median dorsal length, with faint, equally-spaced lines of sculpture on notum, sides much rounded; bristles at posterior angles long and conspicuous, about 54 μ long; posterior margin with three pairs of bristles, the inner pair longer and stouter than the others and about comparable with the midlaterals; other bristles on pronotum likewise dark and conspicuous, disposed in about 25 pairs. Wings of fore pair (Pl. IX, fig. 3) with about 22 bristles on costal margin, 4 + 3 at base of anterior vein and 1 + 1 + 1 (the last two closer together) in distal two-fifths, and 10 or 11 on posterior vein.

Abdomen of moderate width; *tergite 8 with complete comb of fine teeth on posterior margin* (Pl. IX, fig. 5); posterior margin of tergite 9 with bristles of inner pair 79 μ long, outer pair 96 μ, lateral pair 87 μ; tergite 10 with bristles of inner pair 82 μ, outer pair 80 μ; sternites with the usual three pairs of long bristles on extreme posterior margin but *devoid of accessory setæ* (Pl. IX, fig. 4); ovipositor about 0.236 mm. long.

Measurements of holotype (♀): Length 1.10 mm.; head, length 0.104 mm.; width across eyes 0.137 mm., width across cheeks 0.136 mm., width at base 0.120 mm.; eyes, length 0.064 mm., width 0.041 mm., interval 0.054 mm., pronotum, length 0.124 mm., width 0.168 mm.; pterothorax, width 0.233 mm.; fore wings, length 0.630 mm.; abdomen, width 0.270 mm.

Antennal segments:	1	2	3	4	5	6	7
Length (μ):	24	38	47	46	36	47	18
Width (μ):	28	24	21	20	18	19	7

Total length of antenna 0.256 mm.

Described from a unique female in the Cameroons, December 10, 1915, by Arthur W.J. Pomeroy, in « flowers of Daisy ».

A brightly and unusually colored little species, readily known by the characters given in the key.

Thrips priesneri sp.nov.

(Pl. X, figs. 1-5.)

Female (macropterous).—Length about 1.4 mm. Color of head and thorax orange-yellow, contrasting conspicuously with the dark blackish brown abdomen, which, however, is distinctly paler basally and somewhat so distally; head, thorax, and basal segment of abdomen with underlying bright orange pigment-

ation ; posterior portion of head clouded with grayish brown, pronotum obscurely maculate, a pair of round spots larger than an ocellus and situated near each anterior angle somewhat better defined than the others, pterothorax dark blackish brown across front and maculate with dark grayish brown dorsally, the anterior half of mesoscutum so darkened, posterior half pale ; metascutum with a line of blackish brown across anterior margin, grayish brown at sides, paler at middle ; legs yellow, with femora and tibiæ usually darkened slightly with grayish brown ; wings of fore pair rich blackish brown, distinctly paler basally (expicially between the veins) and narrowly in most of distal three-fifths between the two principal veins ; antennæ blackish brown, darkest in segments 4 - 7, segment 1 palest, 2 darker than 1 but lightened at middle and apically and suffused with orange, 3 pale gray in basal fourth or fifth, 4 and 5 with a narrow gray ring just beyond pedicel, 6 paler apically, 7 concolorous with apical portion of 6 ; body and wing bristles dark blackish brown (paler on legs) and conspicuous ; ocellar pigmentation bright orange-red.

Head (Pl. X, fig. 1) about 1.32 times broad across eyes as median dorsal length, and about 0.75 as long as pronotum, hardly as broad across cheeks as across eyes, the transverse lines dark, distinct, and numerous, but not deep, thus not forming deep serræ along the cheeks ; cheeks decidedly curved, somewhat converging posteriorly ; vertex somewhat hollowed in front of ocelli, not forming an overhanging elevation but sloping nearly evenly downward from ocelli to frontal costa, this last only slightly notched ; interocellar and postocellar bristles subequal (32 μ), the latter more widely spaced than the former, hardly comparable with midlaterals or the innermost pair on posterior margin of pronotum, but distinctly larger than postoculars ; interocellars situated opposite posterior margin of median ocellus, just outside lines tangent to outer margins of median and posterior ocelli ; ventral surface of head with the two pairs of long bristles near bases of antennæ, the inner pair (56 μ), longer than the outer pair (49 μ) and considerably surpassing base of second antennal segment. Eyes large, about 0.60 as long as head and about 0.73 as wide as their interval, somewhat protruding, pilose as usual. Ocelli distinctly behind middle of eyes, but with the distance from the hind margin of posterior pair to line of hind margin of eyes fully equal to diameter of ocelli. Antennæ (Pl. X, fig. 2) long, about 2.8 times the length of head, more slender than usual but otherwise of normal shape and structure, segment 3 nearly 3.2 times as long as wide and slightly longer than 6, the latter fully 3.5 times as long as wide and more than three times as long as 7. Maxillary palpi three-segmented, as usual, the segments measuring 20 μ, 11 μ, and 19 μ, respectively.

Prothorax about 1.34 times as wide as median dorsal length, with distinct, equally-spaced, pale lines of sculpture on notum, sides only slightly curved, scarcely converging anteriorly ; bristles at posterior angles long and

conspicuous, the outer pair 84 μ long, inner 90 μ; posterior margin with three pairs of bristles, the inner pair (52 μ) much larger than the others and about comparable with mid laterals; other bristles on pronotum likewise particularly large, dark, and conspicuous, disposed in 22-26 pairs .Wings of fore pair (Pl. X, fig. 3) with about 25 bristles on costal margin, 4+3 (sometimes 3+4) at base of anterior vein and 1+1+1 (usually equidistant; rarely 4) in distal two-fifths, and 13 - 15 on posterior vein.

Abdomen of moderate width; tergite 1 distinctly and closely transversely striate with dark anastomosing lines; *tergite 8 with complete comb of fine teeth on posterior margin* (Pl. X, fig. 5); posterior margin of tergite 9 with bristles of inner pair 116 μ long, outer pair 132 μ, lateral pair 124 μ; tergite 10 with bristles of inner pair 113 μ, outer pair 105 μ; sternites with the usual three pairs of long bristles on extreme posterior margin but *devoid of accessory setae* (Pl. X, fig. 4); *ovipositor unusually long* (0.38 - 0.40 mm.).

Measurements of paratype (♀): Length 1.40 mm.; head, length 0.120 mm., width across eyes 0.158 mm., width just behind eyes 0.150 mm., width across cheeks 0.156 mm., width at base 0.140 mm.; eyes, length 0.072 mm., width 0.047 mm., interval 0.064 mm.; pronotum, length 0.160 mm., width 0.214 mm., length of outer bristles at posterior angles 0.084 mm., of inner ones 0.090 mm.; pterothorax, width 0.296 mm.; fore wings, length 0.810 mm.; abdomen, width 0.326 mm.; ovipositor, length 0.408 mm.

Antennal segments:	1	2	3	4	5	6	7
Length (μ):	28	44	67	63	51	64	19
Width (μ):	32	26	21	20	17	18	7

Total length of antenna 0.336 mm.

Described from 14 females, all taken February 16, 1916, in the Cameroons, by Arthur W. J. Pomeroy, in "flowers of a large shrub" [Hood No. 177].

Named after Dr. Hermann Priesner, to whom I am indebted for numerous kindnesses.

Thrips meliæfloris sp. nov.

(Pl. XI, figs. 1-5.)

Female (macropterous). — Length about 1.07 mm. General color straw-yellow; head sometimes darkened with gray in ocellar triangle and across occiput; pronotum lightly and irregularly washed with gray at middle; pterothorax dark blackish brown across front margin and with two gray spots on metascutum; abdominal tergites 1-8 each with a well-defined median grayish

brown blotch occupying all of its length and more than half of its width, each blotch much broader at base than at apex (excepting the first, which is narrower at base), and with a much darker brown line at extreme base in addition to an arcuate dark line of sculpture just beyond; abdominal tergites 9 and 10 blackish brown, 9 paler across basal fifth; legs uniform pale straw-yellow; wings grayish brown, decidedly paler in basal fourth (except along veins), and slightly lighter in distal portions between the two principal veins; antennæ concolorous with body in segment 1, segment 2 decidedly darker and with a yellowish cast in the pale middle and apical portions, 3 yellowish, lighter than 2 but darker than 1, shaded with grayish brown apically, 4-7 dark grayish brown, 4 paler basally and 5 narrowly just beyond pedicel; body and wing bristles dark blackish brown and conspicuous; ocellar pigmentation bright red.

Head (Pl. XI, fig. 1) about 1.4 times as broad across eyes as median dorsal length, and about 0.84 as long as pronotum, sligthly broader across cheeks than across eyes, the transverse lines dark and distinct but not numerous or deep, thus not forming deep serræ along the cheeks; cheeks decidedly curved, somewhat converging posteriorly; vertex somewhat hollowed in front of ocelli, not forming an overhanging elevation but sloping nearly evenly downward from ocelli to frontal costa, this last narrowly and acutely notched; interocellar and postocellar bristles subequal (22 μ), hardly comparable with midlaterals or the innermost pair on posterior margin of pronotum, but distinctly larger than postoculars; interocellars situated very close to median ocellus, just within the ocellar triangle, the distance between them about one-half the distance between postocellars; ventral surface of head with the two long bristles near bases of antennæ, the inner pair (30 μ) longer than the outer pair (24 μ) and just surpassing base of second antennal segment. Eyes large, about 0.60 as long as head and about 0.84 as wide as their interval, somewhat protruding, pilose as usual. Ocelli distinctly behind middle of eyes, but with the distance from the hind margin of posterior pair to line of hind margin of eyes about equal to diameter of ocelli. Antennæ (Pl. XI, fig. 2) long, about 2.7 times the length of head, somewhat more slender than usual but otherwise of normal shape and structure, segment 3 about 2.84 times as long as wide and slightly longer than 6, the latter three times as long as wide and more than three times as long as 7. Maxillary palpi three-segmented, as usual.

Prothorax about 1.6 times as wide as median dorsal length, with faint, equally-spaced, pale lines of sculpture on notum, sides curved and scarcely converging anteriorly; bristles at posterior angles long and conspicuous, the outer pair about 54 μ long, inner 61 μ; posterior margin with three pairs of bristles, the inner pair (28 μ) longer than the others and about comparable with midlaterals; other bristles on pronotum likewise dark and moderately conspicuous, disposed in about 26 pairs. Wings of fore pair (Pl. XI, fig. 3) with about 24 bristles on costal margin, 4+3 at base of anterior vein and

1+1+1 (the last two usually closer together; rarely only 2) in distal two-fifths, and ordinarily about 12 on posterior vein.

Abdomen of moderate width; *tergite 8 with complete comb of fine teeth on posterior margin* (Pl. XI, fig. 5); posterior margin of tergite 9 with the bristles of inner pair about 74 μ long, outer pair 82 μ, lateral pair 78 μ; tergite 10 with bristles of inner pair 81 μ, outer pair 80 μ; sternites with the usual three pairs of long bristles on posterior margin but *devoid of accessory setæ* (Pl. XI, fig. 4); ovipositor short, about 0.22 mm. in length.

Measurements of paratype (♀): Length 1.07 mm.; head, length 0.101 mm., width across eyes 0.139 mm., width just behind eyes 0.133 mm., width across cheeks 0.142 mm., width at base 0.132 mm.; eyes, length 0.060 mm., width 0.044 mm., interval 0.052 mm.; pronotum, length 0.120 mm., width 0.192 mm., length of outer bristles at posterior angles 0.054 mm., of inner ones 0.061 mm.; pterothorax, width 0.255 mm.; fore wings, length 0.675 mm.; abdomen, width 0.288 mm.; ovipositor, length 0.216 mm.

Antennal segments:	1	2	3	4	5	6	7
Length (μ):	26	38	54	52	40	50	15
Width (μ):	27	24	19	18	17	17	6

Total length of antenna 0.275 mm.

Described from 12 females, taken by Arthur W. J. Pomeroy at Ibadan, S. Nigeria, January 14, 1915, in flowers of *Melia azedarach* [Hood No. 53].

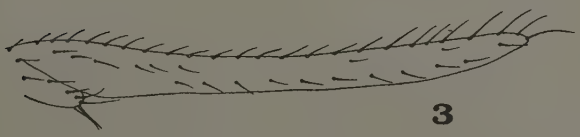
Though very much like *T. japonicus* Bagnall in general appearance, this species differs conspicuously in lacking the row of about 12 long accessory bristles across the middle of the abdominal sternites.

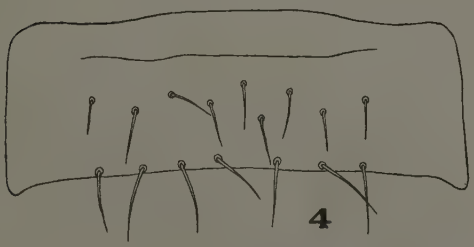
Thrips hispidipennis sp.nov. (♀)

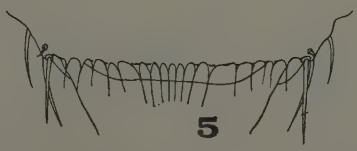
Fig. 1. — Head and prothorax, holotype; setae of legs omitted.
Fig. 2. — Left antenna, holotype.
Fig. 3. — Right fore wing, paratype; fringing hairs omitted.
Fig. 4. — Tergite 8, paratype.
Fig. 5. — Sternite 4, holotype.

J. Douglas Hood

Planche IV

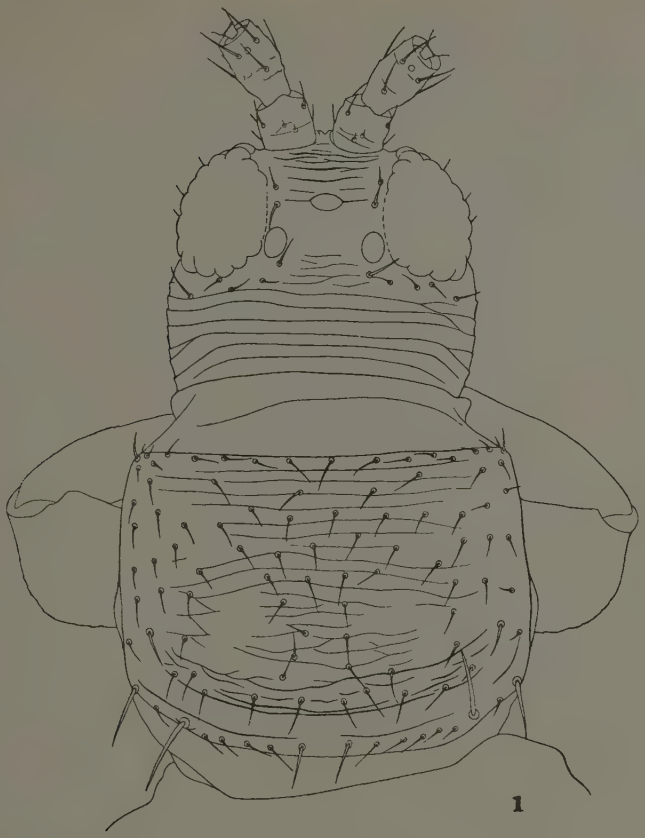


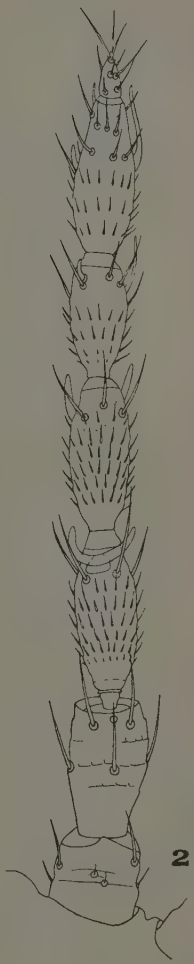


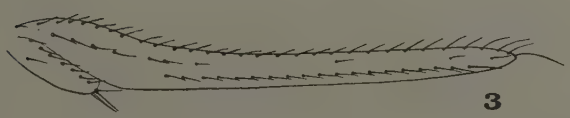


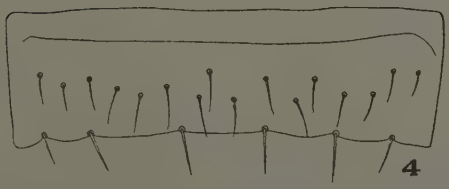
Thrips quadrisetosus sp.nov. (♀)

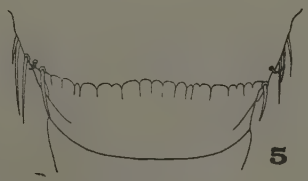
Fig. 1. — Head and prothorax, holotype; setae of legs omitted.
Fig. 2. — Left antenna, paratype.
Fig. 3. — Right fore wing, paratype; fringing hairs omitted.
Fig. 4. — Sternite 4, paratype.
Fig. 5. — Tergite 8, paratype.





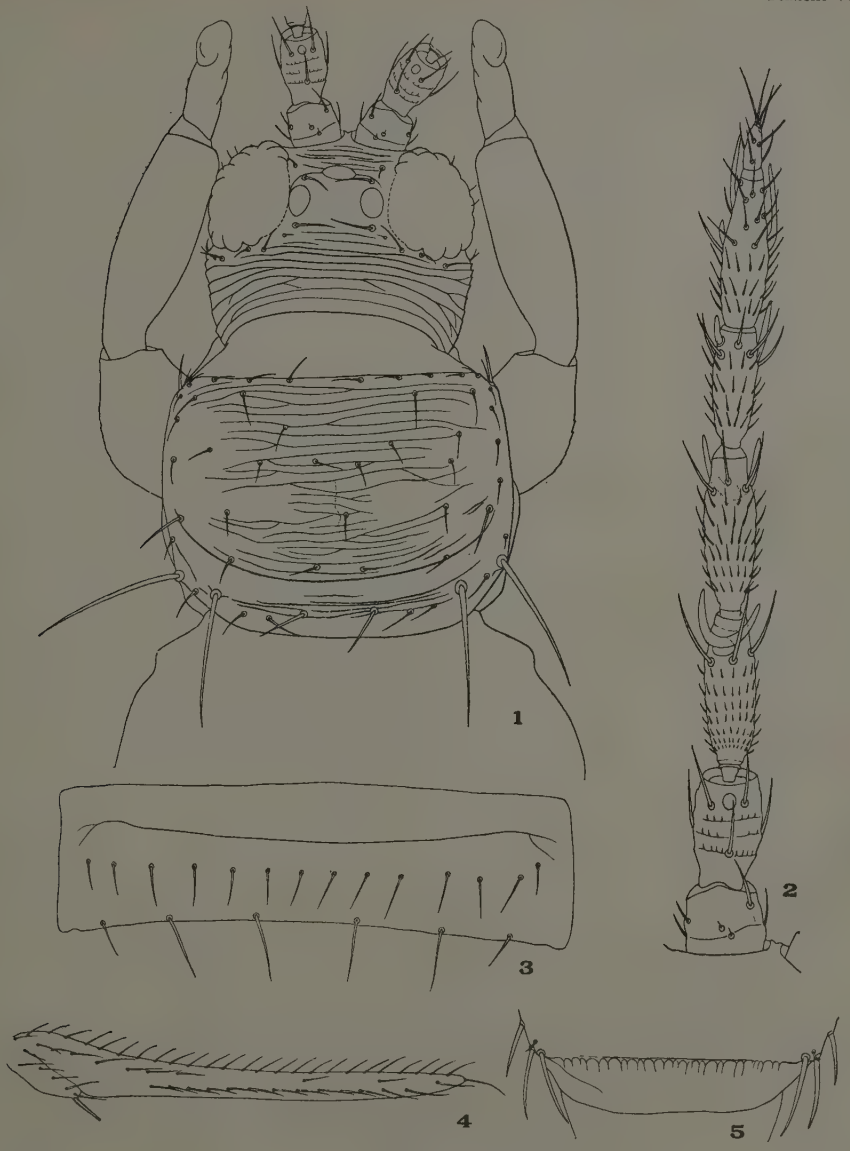






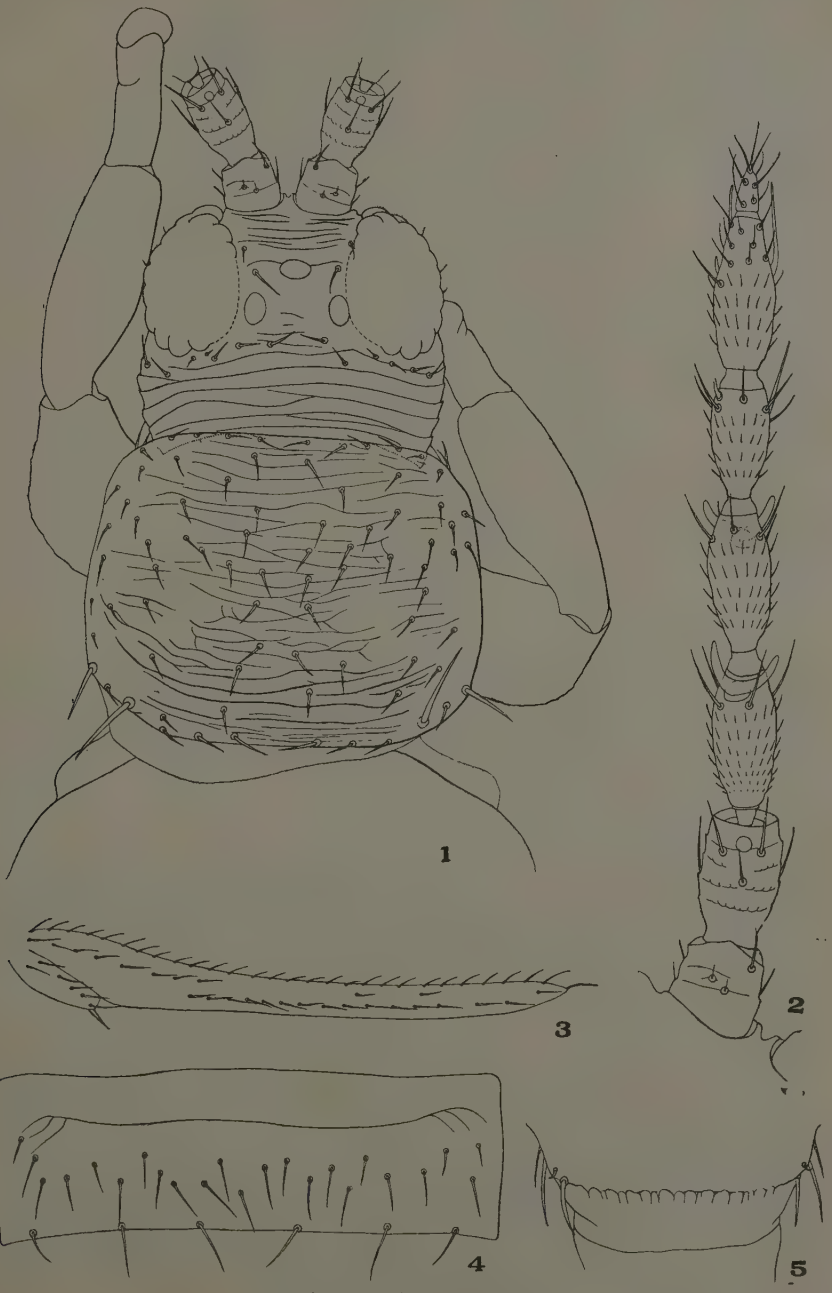
Thrips hirtiventris sp.nov. (♀)

Fig. 1. — Head and prothorax, holotype; setae of legs omitted.
Fig. 2. — Left antenna, paratype.
Fig. 3. — Right fore wing, paratype; fringing hairs omitted.
Fig. 4. — Sternite 4, paratype.
Fig. 5. — Tergite 8, paratype.



Thrips exilicornis sp.nov. (♀)

Fig. 1. — Head and prothorax, holotype; setae of legs omitted.
Fig. 2. — Left antenna, holotype.
Fig. 3. — Sternite 4, paratype.
Fig. 4. — Right fore wing, paratype; fringing hairs omitted.
Fig. 5. — Tergite 8, paratype.



Thrips spadix sp.nov. (♀)

Fig. 1. — Head and prothorax, holotype; setae of legs omitted.
Fig. 2. — Left antenna, paratype.
Fig. 3. — Right fore wing, paratype; fringing hairs omitted.
Fig. 4. — Sternite 4, paratype.

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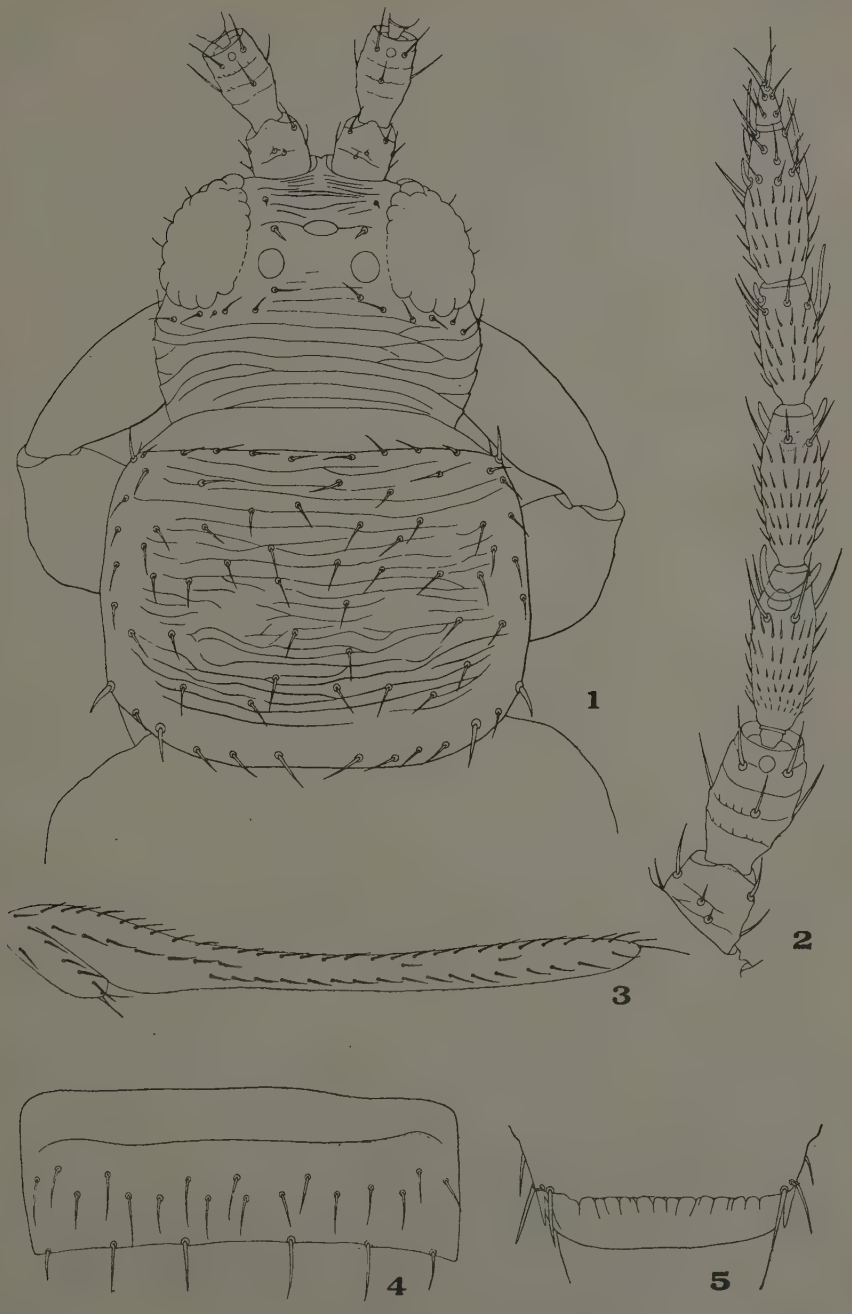
Planche VIII

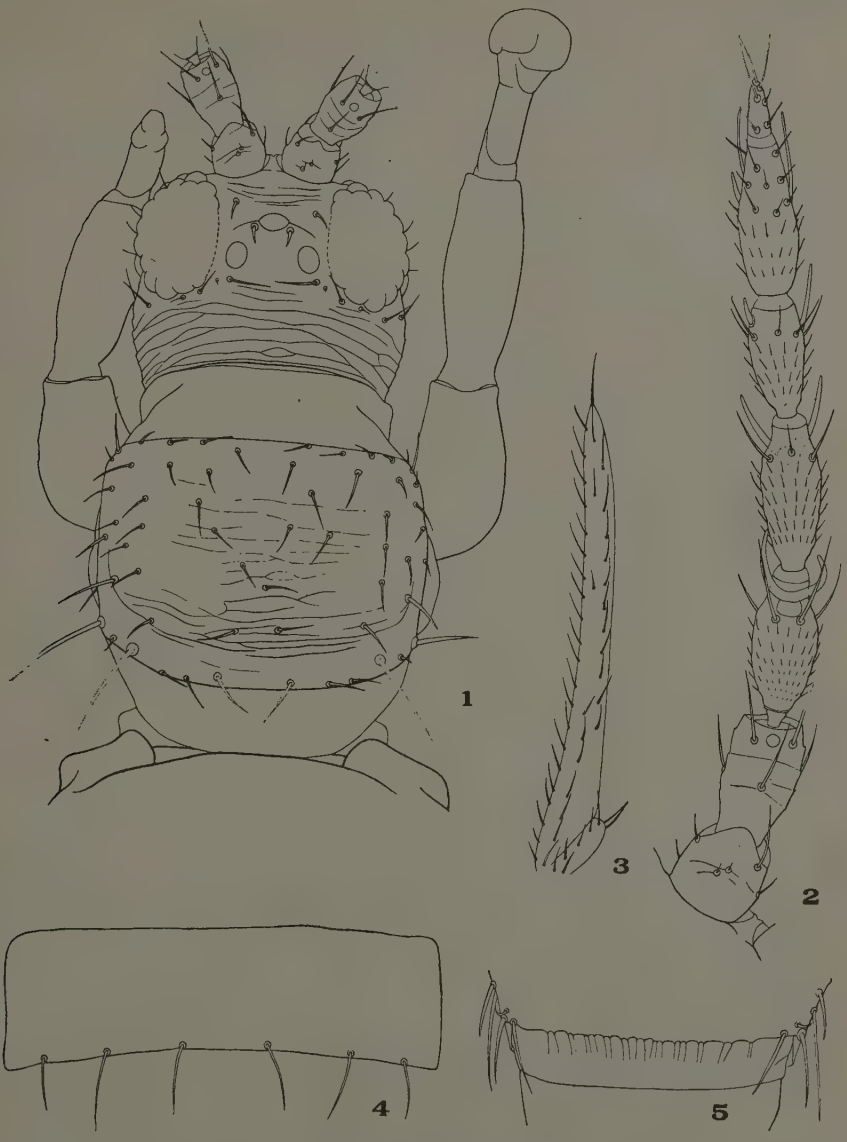


Thrips spadix var. *brevipes* nov. (♀)

Fig. 1. — Head and prothorax, holotype; setae of legs omitted.
Fig. 2. — Left antenna, paratypes.
Fig. 3. — Right fore wing, paratype; fringing hairs omitted.

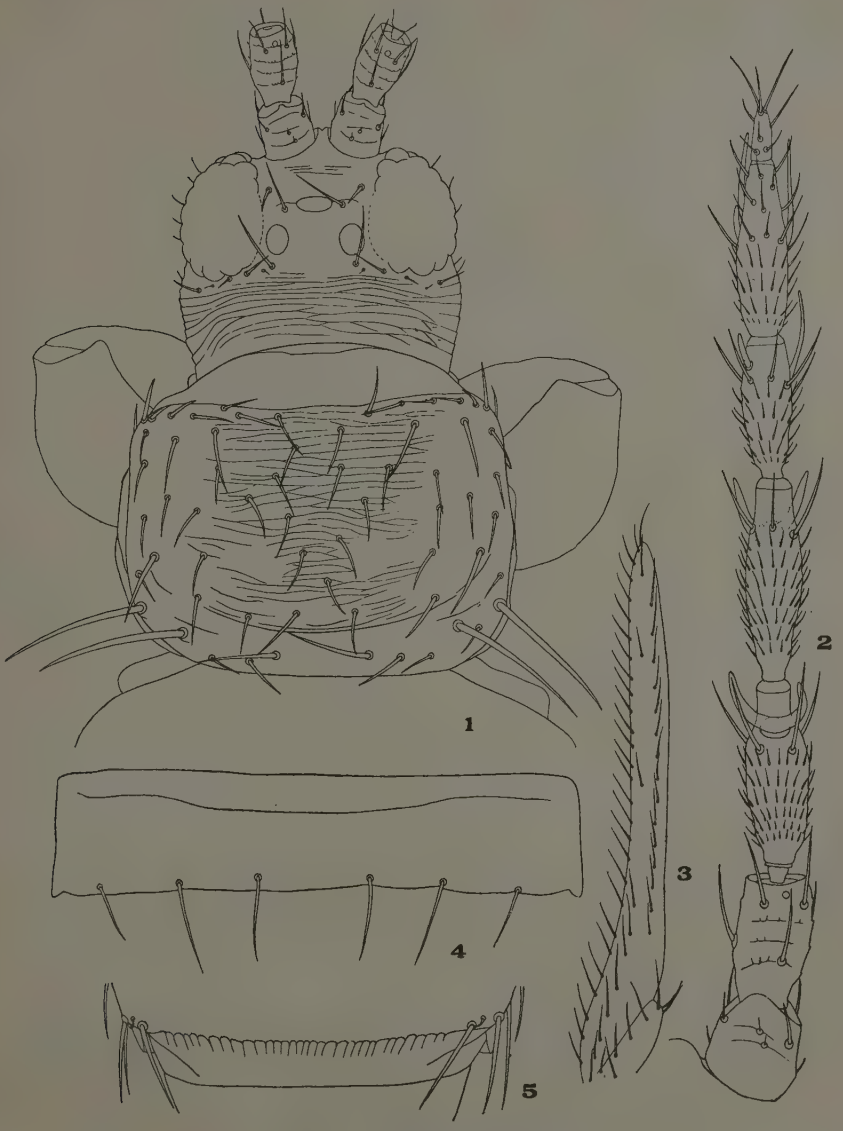
J. Douglas Hood

Planche IX



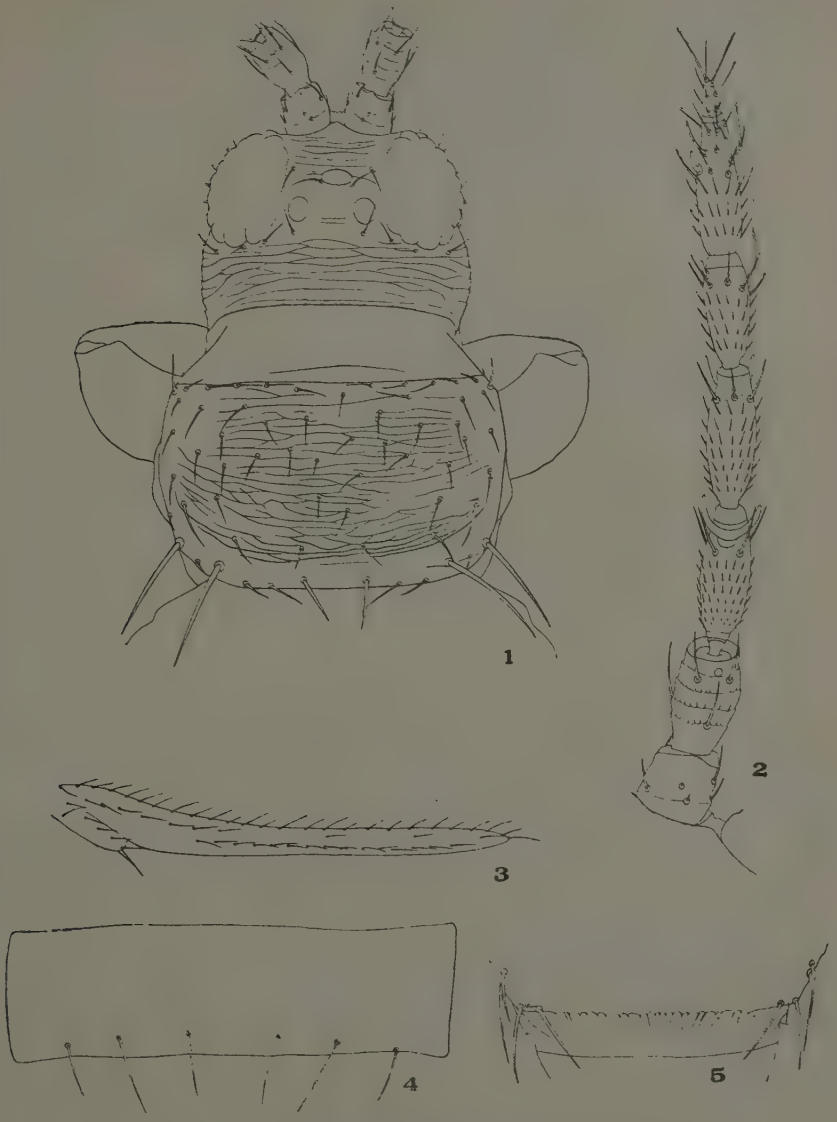
Thrips aurantithoracis sp.nov. (♀)

Fig. 1. — Head and prothorax, holotype; setae of legs omitted; missing bristles and parts of bristles shown by dotted lines.
Fig. 2. — Left antenna, holotype.
Fig. 3. — Right fore wing, holotype; fringing hairs omitted.
Fig. 4. — Sternite 4, holotype.
Fig. 5. — Tergite 8, holotype.



Thrips priesneri sp.nov. (♀).

Fig. 1. — Head and prothorax, holotype; setae of legs omitted.
Fig. 2. — Left antenna, paratype.
Fig. 3. — Right fore wing, paratype; fringing hairs omitted.
Fig. 4. — Sternite 4, paratype.
Fig. 5. — Tergite 8, paratype.



Thrips meliaefloris sp.nov. (♀)

Fig. 1. — Head and prothorax, holotype; setae of legs omitted.
Fig. 2. — Left antenna, paratype.
Fig. 3. — Right fore wing, paratype; fringing hairs omitted.
Fig. 4. — Sternite 4, paratype.
Fig. 5. — Tergite 8, paratype.

Preliminary notes on *Scirtothrips* in Egypt, with Key and Catalogue of the *Scirtothrips* species of the world

(with Plate XII (figs 1-6) and Text-Figures 7-8)

by Prof. Dr. H. Priesner.

There was no record on *Scirtothrips* in Egypt, and even the specialists did not know anything about Egyptian representatives of this genus. But recently we have been able to discover here two distinct species belonging to this genus which seem to be distributed well over the country. In 1929 we found one of them on *Convolvulus arvensis*, during turf examinations, with the aim of stating the host plants of *Thrips tabaci* (the Egyptian Cotton thrips). Later on, in 1930, the same species was found abundantly on Sunt trees (*Acacia nilotica*). A second species was discovered damaging Mango trees in 1930, and recorded from Southern Egypt on *Parkinsonia aculeata*. A third species, representing another subgenus, was described by me from Egypt, already in 1921 (1) under the name *Anaphothrips antilope* which is, however, better placed in the genus *Scirtothrips* Shull.

The insects in question may be widely distributed, partly beyond Egypt. In 1929, J. C. Faure wrote a paper on *Scirtothrips* in South Africa wherein he described the forms occuring there. The most important one of them is *Scirtothrips aurantii*, a pest of Citrus trees; and W. J. Hall has given a full account on the life history, and control of this insect in South Africa (2).

When I examined the Egyptian species of *Scirtothrips*, after comparison with types from J. C. Faure's collections (3), I found one of the Egyptian species identical with *Sc. aurantii*, the other one very closely allied to *Scirtothrips africanus* Faure (t.c.p. 3).

The first mentioned form, known as a Citrus pest in South Africa, has never been recorded as attacking Citrus trees in Egypt, it was found on *Acacia*, and *Convolvulus*, two taxonomically widely separated plants, and may therefore live on some other plants; the other species, our Mango thrips, attacks also *Parkinsonia*.

The third species, *Scirtothrips antilope* Pr. is so far of no economic im-

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(1) Entom. Mitteil. XII, 1, 1921, p. 63, figs 1 and 2.

(2) J. C. Faure, Transvaal University College, Bull. 18, 1929, 18 pp., 4 pl.; W. J. Hall, Brit. South Africa Comp., Publ. No. 1, 1930, pp. 55, 8 plates.

(3) I am very much indebted to Prof. J. C. Faure for having enabled me to compare the South African species of *Scirtothrips* with the Egyptian species.

portance, it is living on desert plants, particularly on *Aerva tomentosa*, and *Zygophyllum coccineum*.

Scirtothrips are very tiny, pale yellow creatures, their small size makes it difficult to distinguish them from other thrips, thus before describing them it may be useful to point to their differences from other yellow thrips occurring in Egypt.

Kow to distinguish Scirtothrips from other yellow thrips of Egypt.

Besides *Scirtothrips* there are some species of yellow colour belonging to other genera which may easily be confused with it. Some of them are common as well, as *Thrips tabaci* in its typical form which is pale yellow, and *Thrips microchactus*, Ka., *nigropilosus*, Uz., *Taeniothrips discolor* f. *lythri*, Ka., and *Taen. niloticus*, Pr., furthermore, *Bolacidothrips graminum*, Pr., *Frankliniella dampfi* Pr., *Dorcadothrips caespitis*, Pr., *Scolothrips longicornis*, Pr., and *Scolothrips uzeli*, Sch., some rarer species, as *Mycterothrips echii*, Pr. and *Mycterothrips acaciae*, Pr.

The following key will serve for distinguishing them.

1(14) Antennae 8- or 9-segmented.
2(5) Pronotum with a long bristle on each *fore* angle of prothorax. Fore wings with two complete rows of setae on their veins.
3(4) Interocellar bristles longer or as long as head. Wings with black spots. ..... **Scolothrips, Hinds.**
4(3) Interocellar bristles shorter than head. Wings pale .... **Frankliniella, Ka.**
5(2) Pronotum without long bristles on its fore angles. Rows of bristles on veins of fore wing interrupted.
6(7) Mouth cone very long and pointed, reaching far beyond prosternum.. ..... **Mycterothrips, Tryb.**
7(6) Mouth cone normal.
8(13) Bristles on wings long, well developed, lower vein with almost complete row of them.
9(12) Maxillary palpi 3-segmented.
10(11) Three distal bristles on upper vein of fore wing. Antennal style slender. Outer bristle on hind angles of prothorax shorter than inner .... **Taeniothrips discolor, Ka.**
11(10) Two distal bristles on upper vein. Antennal style thicker. Bristles on hind angles of prothorax of about equal length .... **Taeniothrips niloticus, Pr.**
12(9) Maxillary palpi 2-segmented ..... **Dorcadothrips, Pr.**
13(8) Bristles on fore wings short and weak, lower vein never with more than four bristles ..... **Scirtothrips, Shull.**

14(1) Antennae with 7 joints.
15(16) Maxillary palpi 2-segmented. Wings with greyish cross bands .... **Bolacidothrips, Pr.**
16(15) Maxillary palpi 3-segmented. Wings without cross markings .... **Thrips, L.**

How to distinguish the species of Scirtothrips occurring in Egypt.

The adults of the three species of *Scirtothrips* are distinguished as follows :

1(2) Antennae indistinctly 9-segmented, because joint 6 is divided by a cross-suture ..... **Sc. antilope (Pr.).**
2(1) Antennae with 8 joints, 6th not divided.
3(4) Fore margins of the tergites and sternites of the abdomen marked with a dark brown line. Male with a comb of stout bristles on the inner edge of the hind femora ..... **Sc. aurantii, Faure.**
4(3) Abdomen uniformly pale yellow. Male without comb on hind femora ..... **Sc. mangiferae, sp.nov.**

Scirtothrips mangiferae, spec.nov.

(Plate XII, figs. 1-6)

Closest to *Sc. africanus*, Faure, from South Africa ; it is distinguished from it in the female sex by the even shorter hind angle bristles of the prothorax, and the colourless bristles of segment 9 and 10 of the abdomen, furthermore by the lower vein of the fore wings of the female which usually carries three bristles, and by the shorter antennae. In the male, this species is recognized by the shorter sickle-shaped bristle of the apex of the abdomen, and by the shorter 2nd dorsal bristle of tergit 9.

Female : Pale yellow, thorax and abdomen sometimes pale orange, abdominal segments without dark cross-lines. Legs pale yellow, only tarsal plate dark. Joints 1 and 2 of the antennae clear yellow, 1 almost whitish, the following joints more or less dark grey, 3 lighter in basal third but nowhere clear yellow. Ocelli crimson, eyes black, wings very faintly shaded greyish yellow ; *bristles on segments 9 and 10 of the abdomen not visible on white substratum* (white paper), bristles on other parts of abdomen darker.

Head strongly transverse, length about 78 μ, width 130 μ, length of eyes 50 μ. Head with hind marginal line which is somewhat separated from the vertex by a pale line but hind margin not darker than the remainder of the head. Ocelli situated normally, hind ocelli on the same level as the hind margin of the eyes. Bristles on head well developed but hardly visible be-

cause of their pale colour; length of lateral bristles behind eyes 14 - 17 μ; anteocellar bristles also well developed; mouth cone short; antennae length 215 - 225 μ; measurements of segments: 17(22), 34(24-25), 41-42(18), 34-35(17), 34(17), 38-39(15), 8(8-9), 11-13(5) μ. Prothorax length 105, width 173 μ, hind angles more distinctly rounded than fore angles, without visible bristles in front but with four pairs of more or less markedly shaded bristles of different lengths on hind margin, b.2 (counted from median line) longest, well 28 μ, b.3 only 17 μ. Pterothorax width 225 μ, length of wings 570-590 μ. Costa with about 28, upper vein with 3+3+1 or 3+5 basal, and 2+1 or 1+1+1 distal bristles; lower vein with 3 (sometimes 4) bristles. Veins very distinct, yellowish. Abdomen provided with microsetulae, tergit 8 with 'comb'; length of dorsal bristles on tergit 9: 36-39 μ, of hind marginals: 48 - 50 μ; these pale, length of those on segment 10 about 53 μ, laterals 40 μ. — Total body length: 0.97 mm., when segments normally distended.

Male: Somewhat paler than the female. Joint 2 of the antennae almost colourless as joint 1, the following joints not so dark grey as in the female. The dark, sickle-shaped bristles on segment 9 light in basal third or fourth.

Head width 130 μ. Antennae length 190-200 μ; measurements of joints: 14(22), 31(22), 36(16), 31(15), 32(15), 34(14), 6(7), 11(5) μ. Prothorax width 150 μ. Inner marginal bristles 25-28 μ, only slightly shaded. Pterothorax width 190 μ. Upper vein with 3+4+1+1 bristles, the so called distals of which being not distinctly separated from the others, or arrangement as follows: 3+6+3; lower vein with three bristles; veins less distinct than in female. Segment 9 of the abdomen with a pair of strongly inward and upward bent sickle-shaped bristles *the tips of which evidently surpass the bases of the bristles of segment 10;* tergit 9 with four pairs of pale bristles, situated exactly as in *Sc. africanus*, becoming shorter outward, and more removed frontally. Their lengths about 42, 36, and 25-28, respectively. Bristles on segment 10 shorter, and arranged in a circle that is opened towards apex of abdomen, length of b.1: 28-31 μ.

Larva.

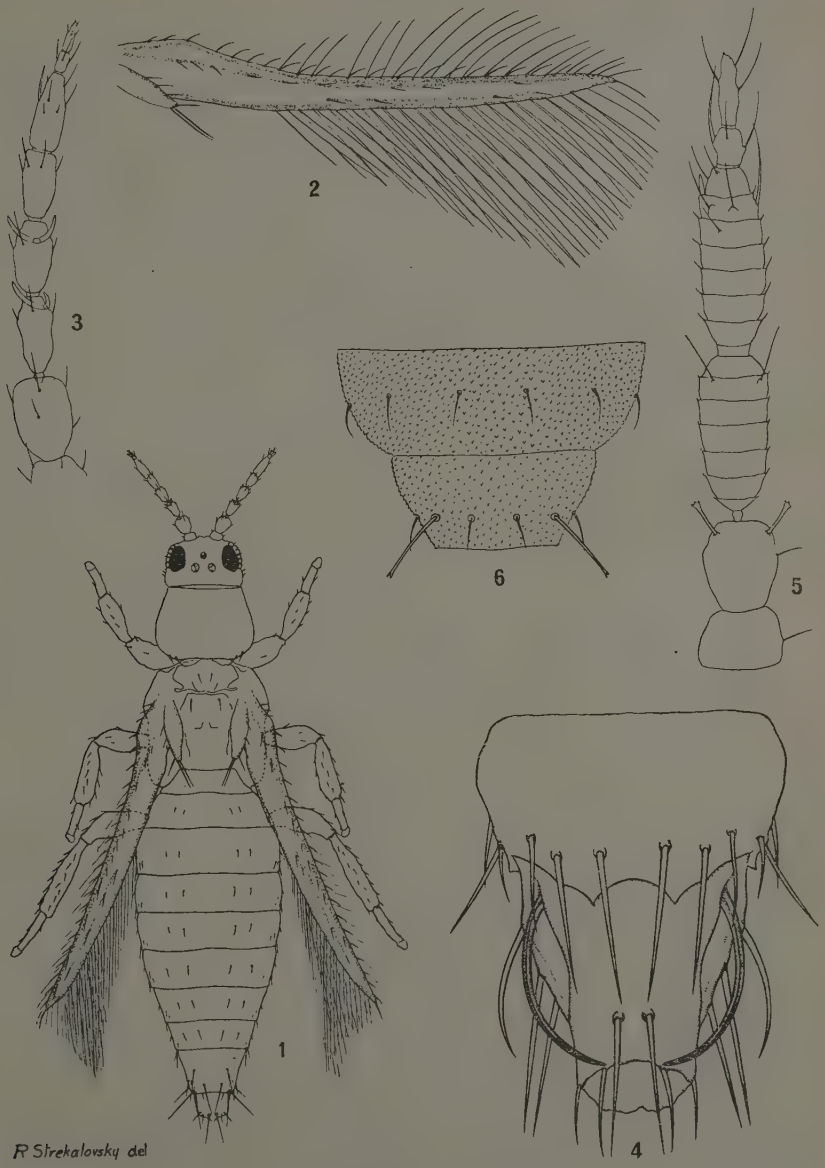
(Plate XII, figs 5 and 6)

First Stage: Pale yellow, body without dark markings. Legs in basal half of femora and outer margin of tibiæ pale greyish, very pale greyish shaded too are joints 1 and basal portion of 2 of the antennae, furthermore apex of joint 4 and all of the following two joints.

Head broader than long, length about 56 μ. Eye bristle strongly knobbed, nearly funnel-shaped, length 13 - 14 μ. Length of antennae 135 μ; length of joints: 8(20), 22(18), 27(20), 45-46+7(18), 8(7), 13(5) μ; joints 2 and 3 with two short, knobbed bristles each, on upper side, joints 3 and 4 with

Dr H. Priesner

Planche XII



Scirtothrips mangiferae, sp.nov.

1. Female totally. — 2. Female, fore wing. — 3. Female, antenna. — 4. Male, terminal abdominal segments, dorsally. — 5. Larva, second stage, antenna. — 6, Larva, second stage, abdominal segments 8 and 9.

strongly marked ringlets and microsetulæ; femora too with short, funnel-shaped bristles. Bristles on prothorax of the same shape, length about 14-17 μ. Cuticle of the abdomen smooth, densely covered with exceedingly tiny microsetulæ; bristles on abdomen very short and tiny, almost pointed, length of those on segment 8 not exceeding 8 μ; segment 9 with 1 pair of pointed b.1, length about 15 μ, and 1 pair (b. 2) of longer, bent, thin knob-bristles of a length of 20 μ; length of b. 1 of segment 10 about 15 μ, thin, knobbed, while b. 2 is nearly pointed, of the same length. No comb on segment 9. — Total body length to 0.5 mm.

Second Stage: Pale yellow, sides of abdomen and apex pale, fading into orange, head in front, between the antennae with grey middle spot, but no other grey marking on the whole body. Joint 1 and basal two thirds of joint 2 of the antennae pale grey, the remaining joints still paler, greyish yellow; basal half of femora and outer margins of tibiae pale grey.

Head width (including eyes) 87 μ, length 73-76 μ. Head bristles funnel-like, length of b. 1 of first set 20, b.2, 22 μ. Length of antennae 190 μ, measurements of joints: 14(21), 29(21), 48, 62, 10(9), 20(6) μ; joint 2 with two knobbed bristles on upper side (11 μ), remaining joints with but pointed bristles. Length of bristles on hind angles of prothorax 20 μ. these pale grey, as most of the dilated bristles of the body. Surface of the cuticle of the abdomen practically smooth, only very tinily dotted, dots only visible in using strongest magnifications. Bristles on abdomen pointed, only b.2 on segment 9 funnel-shaped, bent, its length 28-31 μ, while b.1 is of half the size of the former, and pointed; b.1 of segment 10 knobbed, length 20 μ, b.2 pointed; segment 9 without comb.—Total body length of full grown larve about 0.69-0.7 mm.

Biology.

The life history of this insect which I have just introduced into science by the above description is not yet completely known, although at present the following data are at hand.

The insect appears in Upper Egypt (Kom Ombo) early in March on *Parkinsonia aculeata*, and probably on other plants, as well. In the latitude of Cairo, however, only single specimens were found, on Citrus, but great numbers of it on mango (*Mangifera indica*), already in April. In the middle of June they seem to reach their greatest increase. At this time one observes adults in both sexes, and larvae of both stages. Eggs are being laid probably, from April and May onwards, into the tissue of the leaves. Certainly there are several generations, as Abdel Aziz Effendi Elsayed found the insects still numerously present in the middle of August (1931). I presume that pupation takes place in the soil, because pupae are not found on the plant. The insects are difficult to detect because of their smallness and pale colour; they are only to be found on the very young, tender leaves, and on

the buds of the trees, especially when the mango trees have the characteristically reddish coloured young foliage. Their movements are very quick, particularly the adults are very active.

Host Plants.

Besides on mango, the species was found, as mentioned already, on *Parkinsonia aculeata*, only once (August 1931) on *Ficus carica*, and in one case (Kena, April 1929) on Citrus foliage. Other host plants are not known to us but it is to be expected that the continuation of our thrips survey will disclose some further host plants.

Damage and Injury.

Scirtothrips mangiferae is supposed to cause two different kinds of injury on mango. By stinging and sucking the tender buds with their tiny mouth parts, the small leaves of the former dry out and die off. It is almost certain that the dead tips of the small leaves of the buds are due to the presence and action of the *Scirtothrips*. We are, however not yet sure, whether another sort of injury, not on the buds but on the young leaves is the work of this thrips. A sort of leaf curl is often to be observed on young mango foliage, and in the cases known to me, always a lot of thrips with their larvae were observed on the underside of the leaves, while a damage as this has always been referred to mealy bugs (*Phenacoccus hirsutus* Gr.). Only a close examination and careful experiments on this subject may settle this latter question.

Control.

With regard to the control of *Scirtothrips mangiferae* I have simply to refer to the remarks made below on the control of the other species, *Sc. aurantii*. The exact time of treatment is one of the questions that has to be solved especially for *Sc. mangiferae*, and also the effect of the spray on the mango trees in Egypt.

Distribution.

Sc. mangiferae is hitherto only known from Egypt (1), nevertheless we are not sure whether is it a native or an imported insect. Since the genus *Scirtothrips* is distributed well over Africa, and India as well, it is possible that it has been imported either from another part of Africa, the thrips fauna of which is only little known, or with mango trees from India, and we have to assume the latter possibility, the more India, in spite of the

(1) Only recently *Sc. mangiferae* has been discovered by W.P.L. Cameron on cotton buds in the Sudan.

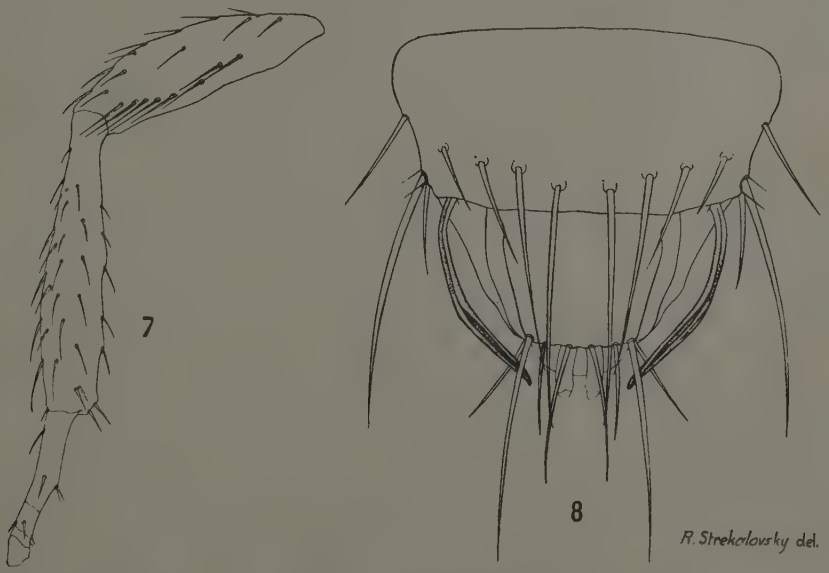
efforts of a keen thysanopterist, is not yet thoroughly investigated. Up to the present this species has not yet been recorded from India. It is, however, widely spread over Egypt, at least from the Cairo region to Asswan.

Scirtothrips aurantii, Faure.

(Figs. 7 & 8)

1929, Faure, Transvaal University College, Bull. No. 18, p. 3, pl. I, figs 1, 3, 5; Pl. II, figs 1, 10.

There is no need of giving an exact description of this species as it has been described in detail by Faure (t.c.). I am only pointing to the striking characters, particularly the differences from *Sc. mangiferae*. The colouring is quite another one; the abdomen has dark basal cross lines of its segments, both, dorsally and ventrally, accompanied by a paler greyish brown central spot of variable size on each segment. Bristles on body shaded. Antennae longer and darker, joint 2 already is distinctly darkened. The male is distinguished from all other species of the genus by a set of stout bristles on the inner margin of the hind femora.



Scirtothrips aurantii, Faure:
Fig. 7. Hind leg of male. — Fig. 8. Terminal abdominal segments of male, dorsally.

The larva, second stage, is very close to that of the mango thrips; colour equal; head width 80 μ, length 70-73 μ. bristles on head 17, and

20 μ, respectively. Antennae length 173 μ; joint 2 above with two funnel-shaped bristles; measurements of antennal segments, 11-14(24), 28(21), 50(22), 42+8(15), 8(8), 17(6) μ. Bristles on hind angles of prothorax with funnel-tip, their length 20 μ. Abdomen practically smooth, covered with exceedingly tiny dots but still they are more distinct than in the larva of *Sc. mangiferae*. On segment 9, there is only *one* pointed bristle recognizeable, having a length of 14-17 μ, and on segment 10 only b.1 (length 15-17 μ)is knobbed at apex.

The first stage larva is not yet known to me.

Biological Notes.

The behaviour is about the same as that of the former species but there is a difference in the host plants. In Egypt, *Sc. aurantii* occurs abundantly on *Acacia arabica* var. *nilotica*, always on the leaves, as both, larva and adult. White spots on the foliage, and black dots (excreta) are the injury, and signs of presence which nevertheless easily can be confused with that of small Jassids, inhabiting the sunt trees. On the life history, W. J. Hall made thorough investigations in South Africa. From these it appears that the eggs are, as expected, laid into the tissue of tender parts of the plant (leaves and young fruits). On the shape of the eggs Hall made a very interesting statement, viz., that they are « bean-shaped » only when within the body of the female but when laid into the tissue, they are oval. This observation would agree with that made by me in 1920 when I examined the eggs of *Thrips klapaleki* within the tissue of the ovaries of *Orchis incarnata* (Priesner, Sitzgsber. Akad. Wiss. Wien, vol. 130, p. 222, 1921) which were oval as well and not bean-shaped. The bean-like shape of the non-deposited eggs is in accordance with the shape of the ovipositor, which is bent. I remember quite well that I turned the eggs in order to be certain that the eggs are oval, when seen from all sides.

Hall observed great mortality of the larvae hatching from the eggs. In *Scirtothrips* there are, as always in the Thripidae, two distinct larval stages. Pupation takes place *above* the soil, in crevices of the leaves or fruits. Duration of egg stage from 6.5 to 11.5 days in December (Southern Rhodesia); the two larval and the prepupal and pupal stages together require 7-11 days. The larval stages together an average of 5.1, prepupal 1.2, and pupal stage 2.7 days. The whole life-cycle lasts, after Hall, about 20 days during the months of October and November. No hibernation was observed, the insects pass the whole year on the Citrus trees. It seems to be susceptible to humidity an increase of the degree of which, combined with a decrease in temperature retards development,

Host Plants.

We have found this species not only on *Acacia* but in Winter numerously also on *Convolvulus arvensis*. I have to emphasize that this insect is a major pest of the Citrus groves in South Africa (s. Hall, l.c.). Here in Egypt we have neither observed yet the injury characteristic to *Scirtothrips* on Citrus, nor has it been discovered on Citrus, even singly, although it is to be expected that they occur on this host. At any rate, it is apparent that in Egypt, *Sc. aurantii* prefers *Acacia*; I may add that *Acacia* is an important, may be the original, host plant also in South Africa; *Combretum*, *Ricinus*, *Prunus amygdalus*, and *Jacaranda* are additional host plants in the last named territory.

Injury.

I have never seen an *Acacia* tree severely damaged by this insect but some leaf drop may occur, as the result of a heavy attack. In South Africa, on Citrus, the leaves and fruits, as well are taken. As a result of the so-called « Oleocellosis », the action of the Citrus oil from the oil glands on the sound tissues, a marked discolouring and deterioration of the fruits take place, only by the mechanical action of the tender mouth-parts of the thrips on the tissue (s. Hall, l.c.) by the act of piercing, the oil is liberated from their glands, and is the sole, and immediate cause of the characteristic staining which, after Hall, can also be produced by any mechanical injury without the presence of the thrips.

Distribution.

Sc. aurantii is recorded from Transvaal, Zululand, Cape Province, and is widely distributed there. In Egypt it has been found, so far, in Cairo district, and in Giza Province but there is no doubt that the continuation of the thrips survey will reveal further localities of occurrence. Recently, Cameron forwarded to me specimens from the Sudan.

Control.

We never know whether the insect will become a pest in Egypt or it will continue to remain as harmless as at present; it may, therefore be advisable to refer in this note to the control measures adopted by Hall in South Africa, after a long series of experiments conducted by this well known Entomologist. The most effective spray-formula has proved the following:

Lime Sulphur (Capex, 36° Baumé),
1 in 100 parts of water;
Nicotin extract (40% Nicotin sulphate),
6 oz.
Capex spreader,
6 oz.

Of greatest importance is, as in any other case, how the spraying is carried out. The trees have to be sprayed thoroughly, they should be entirely wettened. Best results were obtained by Hall with a power spraying outfit at a constant pressure of 250-300 lb. As the most suitable time for application was found the time when the petals have fallen, and the young fruits are just forming. The spray has to be repeated after every possible egg within plant tissues has hatched which naturally varies according to temperature.

I thought it adviseable to add a key for identification of the species of this genus, and a complete catalogue.

Key for identification of the species of the Genus Scirtothrips.

FEMALES.

1(4) Sixth antennal segment with division, antennae seemingly 9-segmented.

2(3) Wings colourless; the single bristle at hind angles of prothorax much less than one third the length of the pronotum.... **antilopé, Pr.**

3(2) Wings very light brown, with a pale spot near base; the single bristle at hind angles of prothorax about one third the length of it..... ..... **crawfordi, Pr., nom.nov.**

4(1) Sixth antennal segment has no division line.

5(25) Abdomen with shadings in form of more or less complete *cross* lines on the sternites or the tergites or on both of them; in some cases with lateral spots, seldom some segments wholly dark.

a(20) Wings little shaded or pale.

6(11) Dark cross-lines complete, almost touching the lateral margins.

7(10) Hind angle bristles of the prothorax 1.5 times to twice as long as the 2nd antennal joint.

8(9) Prothorax about 1.6 times as broad as long. Hind angle bristles 1.6 times as long as the width of antennal joint 2. Lower vein with 1 bristle in apical half ..... **australiae, Hood.**

9(8) Prothorax about twice as broad as long. Bristles on hind angles more than twice as long as the width of the 2nd antennal joint, lower vein of fore wing with 3 to 4 bristles ..... **spinosus, Faure.**

10(7) Hind angle bristles of the prothorax much shorter, directed inward. ..... **fulleri, Faure.**

11(6) Cross-lines on tergites not complete, not extending to margins.

12(13) Hind margin of hind femora with about four distinct bristles. Pronotum not decidedly spotted, abdomen without side spots .... **aurantii, Faure.**

13(12) Hind margin of hind femora only with inconspicuous hairs.
14(17) Abdomen with a pair of lateral spots behind the fore margin of each tergite. Legs and pronotum spotted.
15(16) South African species ..... **combreti, Faure.**
16(15) Californian species ..... **aceri, Moulton.**
17(14) Abdomen without such small lateral spots but cross-lines well developed.
18(19) Behind the dorsal cross-lines a brown-grey, central spot, connected with the cross-lines ..... **dorsalis, Hood**
19(18) Without spot behind the cross-bands ..... **acaciae, Moulton**
20(a) Wings markedly shaded.
21(22) Wings with cross bands ..... **batatae, Bondar.**
22(21) Wings without cross-bands.
23(24) Abdomen pale yellow, prothorax without markings. Cross-lines on abdomen are not extending over the whole segments ..... **longipennis, Bagn.**
24(23) Abdomen grey brown, prothorax with markings. Cross-lines on tergites (missing on sternites) reaching the margins ..... **zuluensis, Faure.**
25(5) Abdomen without grey or brown shadings.
26(27) Wings with cross-bands ..... ? Anaphothrips **signipennis, Bagn.**
27(26) Wings not banded.
28(29) Antennae very long, joint 4 decidedly vasiform. Total length of antennae 340 μ ..... **angusticornis, Karny.**
29(28) Antennae otherwise.
30(31) Wings only four times as long as width of head. Antennae brown, excepting joint 1 which is brown, base of intermediate joints grey ..... **brevipennis, Hood.**
31(30) Otherwise.
32(37) Bristles at hind angles of prothorax more than twice as long as width of antennal joint two.
33(34) Body pale orange; long bristles on prothorax shaded. Antennal joints shaded at least from fourth onward ..... **citri, Moult.**
34(33) Bristles on prothorax pale, transparent, not distinctly shaded.
35(36) Antennae unicolourously yellowish. Body lemon yellow, without any shade. Wings yellowish ..... **ruthveni, Shull.**
36(35) Antennae shaded with grey towards apex. Body transparent whitish, variably slightly shaded with yellowish brown. Wings transparent, clear, whitish ..... **albus, Jones.**
37(32) Bristles on hind angles of prothorax shorter.
38(39) Prothorax somewhat longer than its greatest width, and more than

twice as long as the head. Lower vein with 3+1 bristles .... **pomeroyi, Moulton.**

39(38) Prothorax shorter, wider than long.

40(41) Colour of the body quite pale, almost white, wings nearly colourless. Hind angles of the prothorax with only 1 hardly visible bristle .... **niveus, Hood.**

41(40) Body pale yellow to pale brownish yellow, wings more or less slightly shaded with greyish yellow.

42(43) Antennae somewhat stouter, length of joint 5: 34-36 μ. Bristles on apex of abdomen light ..... **mangiferae, Priesn.**

43(42) Antennae somewhat longer, slenderer, length of joint 5: 38-40 μ. Bristles on end of abdomen shaded ..... **africanus, Faure.**

CATALOGUE.

A. Subgenus Proscirtothrips, Karny (5)

Scirtothrips antilope, Priesner, 1923. — Egypt, Sudan.
Anaphothrips antilope, Priesner, Entom. Mitteil., XII, 1, p.63, fig.1, 2.

Sc. crawfordi, nom. nov. — California.
Anaphothrips longipennis; Crawford, Pomona Coll. Journ., II, 1, p. 150, fig. 62. Without examination of the types it is impossible to ascertain whether this species belongs to *Scirtothrips* or *Oxythrips;* in the latter case the name *longipennis* can remain.

B. Subgenus Scirtothrips s.str.

Sc. acaciae, Moulton, 1930, Ann. Mag. Nat. Hist. (10), V, p. 200. — Gold Coast.

Sc. aceri, Moulton, Trans. Amer. Ent. Soc., LII, p. 122, Pl. V, fig. 4-8. — California.

Sc. africanus, Faure, 1929, Trans. Univers. Coll., Bull. 18, p. 1, 2, 12, Pl. II, fig. 13. — South Africa.

Sc. albus, Jones, 1912. — California.
Anaphothrips albus, Jones, Tech. Ser. No. 23, I, Bur. Ent. U.S. Dept. Agric., 1912, p. 16, Pl. 4, figs. 5-8.
Scirtothrips albus, Karny, Zool. Ann., IV, 1912, p. 334.

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(5) Karny (Treubia I, 4, p. 237) has not designated any type, in establishing this subgenus; I consider *Sc. antilope* as type of it, since *Sc. zeae* Mlt., and *tricolor* Mlt. do not belong here (Comp : Karny, Zool. Ann., IV, 1912, p. 334).

Scirtothrips albus, Hood, Proc. Ent. Soc. Washington, XVI, 1914, p. 40.
Scirtothrips albus, Watson, Synopsis, p. 33, 1923.

Sc. angusticornis, Karny, 1923, Journ. Siam Soc., XVI, 2, p. 91, fig. 1.— Siam. Does certainly not belong into this genus.

Sc. aurantii, Faure, 1929. — South Africa, Egypt, Ital. Somali.
Faure, Transvaal Univ. Coll., Bull. 18, p. 2, 3; Pl. I, figs. 1, 3,5; Pl. II, figs. 7, 10.—Hall, Brit. South Africa Comp., Publ. 1, 1930, 56 pp., Pl. I-VIII..

Sc. australiae, Hood, 1919. — Queensland.
Hood, Proc. Biol. Soc. Washington, XXXII, p. 75.

Sc. batatae, Bondar, 1931, Bol. Lab. Path. Veget., 10, p. 23, fig. 8. — Brazil. Does very probably not belong to *Scirtothrips*.

Sc. brevipennis, Hood, 1914. — Maryland, U.S.A.
Hood, Ins. Insc. Menstr., II, 2, p. 18.
Hood, Ins. Insc. Menstr., V, p. 59, 1917.
Watson, Synopsis, p. 33, 1923.

Sc. citri, Moulton, 1909. — North America.
Euthrips citri, Moulton, Tech. Ser. No. 12, Pt. VII, Bur. Ent. U.S. Dept. Agr., p. 121.
Physothrips citri, Karny, Zool. Ann., IV, 1912, p. 339.
Sc. citri, Hood, Proc. Ent. Soc. Washington, XVI, 1914, p. 37, 40.
Sc. citri, Watson, Synopsis, 1923, p. 33.
Sc. citri, Blunck, in Sorauer, Hdbch. f. Pflanzenkrkhtn., 1925, p.254.
Sc. citri, Priesner, in Stellwaag, Weinbauinsekten, p. 170, 1927.

Sc. combreti, Faure, 1929. — South Africa.
Faure, Transvaal Univ. Coll., Bull. 18, p. 2, 8, Pl. II, fig. 8.

Sc. dorsalis, Hood, 1919. — India.
Hood, Ins. Insc. Menstr., VII, 4-6, p. 90.
Ramakrishna Ayyar, Journ. Bombay Nat. Hist. Soc., 1925, p. 5 (Sep.).
Ramakrishna Ayyar, Imp. Dept. Agr. Ind., Vol. X, No. VII, p. 251, 1928.
Ramakrishna Ayyar & Margabandhu, Journ. Bombay Nat. Hist. Soc., XXXIV, 1931, p. 1032.

Sc. fulleri, Faure, 1929. — South Africa.
Faure, Transvaal Univ. Coll., Bull. 18, p. 2, 10; Pl. I, fig. 6, Pl. II, figs. 9-11.

Sc. longipennis, Bagnall, 1909. — Europe, North America.
Euthrips longipennis, Bagnall, Ann. Soc. Ent. Belg., LIII, p. 173.
Euthrips longipennis, Bagnall, Journ. Econ. Biol., IV, 2, p. 4, 1909.
Euthrips longipennis, Bagnall, Journ. Econ. Biol., VI, p. 10, 1911.
Euthrips parvus, Moulton, Synopsis, p. 26, 38, 1911.
Physothrips longipennis, Karny, Zool. Ann., IV, p. 339, 1912.
Physothrips parvus, Karny, Zool. Ann., IV, p. 340, 1912.
Physothrips longipennis, Karny, Zeit. wiss. Insect.-Biol., p.367, 1914.
Physothrips parvus, Karny, Zeit. wiss. Insect.-Biol., p. 368, 1914.
Scirtothrips longipennis, Hood, Proc. Ent. Soc. Washington, XIV, 1, p. 37, 40, 1914.
Euthrips longipennis, Van Eecke, Entomol. Berichten, 118, p. 314, 1921.
Euthrips longipennis, Van Eecke, Nat. Verh. Akad. Wetensk. Haarlem, p. 115, 1922.
Euthrips parvus, Van Eecke, Nat. Verh. Akad. Wetensk. Haarlem, p. 136, 1922.
Euthrips parvus, Thomsen, Entom. Meddelelser, XIV, p.110-119,1923.
Scirtothrips longipennis, Watson, Synopsis, p. 32, 33, 1923.
Scirtothrips longipennis, Ahlberg, Medd. 263 Centralanst., No. 42, Ent., 1924, p. 11, fig. 9; p. 16; p. 21, fig. 16.
Scirtothrips longipennis, Priesner, Konowia, IV, p. 144, 1925.
Scirtothrips longipennis, Ahlberg, Ent. Tidskr., 1925, p. 155.
Scirtothrips longipennis, Blunck in Sorauer, Hdlb. f. Pflanzenkr., 1925, p. 254.
Scirtothrips longipennis, Priesner, Thys. Europas, p. 169, 1926.
Scirtothrips longipennis, Maltbaek, Ent. Meddel., 16, 1928, p. 168.

Sc. niveus, Hood, 1913. — North America.
Hood, Proc. Biol. Soc. Washington, XXVI, p. 161.
Hood, Proc. Ent. Soc. Washington, XVI, 1914, p. 40.
Hood, Ins. Insc. Menstr., V, 1917, p. 59.
Watson, Synopsis, p. 33, 1923.

Sc. owreyi, Watson = *Frankliniella fusca* Hinds (teste Hood).

Sc. pomeroyi, Moulton, 1930. — Gold Coast.
Moulton, Ann. Mag. Nat. Hist. (10), V, p. 199.

Sc. ruthveni, Shull, 1909, Genotype. — North America.
Shull, Ent. News, p. 222.
Moulton, Synopsis, 1911, p. 26.
Jones, Tech. Ser. 23, Bur. Ent., U.S. Dept. Agr., 1912, p. 15.
Hood, Proc. Ent. Soc. Washington, XVI, 1914, p. 40.

Hood, Ins. Insec. Menstr., V, 1917, p. 59.
Watson, Synopsis, 1923, p. 33.

Sc. signipennis, Bagnall, 1914. — Ceylon.
Bagnall, Ann. Mag. Nat. Hist., Ser. 8, XIII, p. 22.
Ramakrishna Ayyar, Journ. Bombay Nat. Hist. Soc., 1925, p.5 (Sep.).— This species may be a *Chaetanaphothrips*.

Sc. spinosus, Faure, 1929. — South Africa.
Faure, Transvaal Univ. Coll., Bull. 18, pp. 1, 2, 16, pl. I, fig. 2, Pl. II, fig. 12.

Sc. mangiferae, Priesner. — Egypt, Sudan.

Sc. tricolor, Moulton, 1911. — North America.
Moulton, Synopsis, pp. 28, 41.
Karny, Zool. Ann., 1912, p. 334.
Is an *Anaphothrips* belonging to a special subgenus.

Sc. ulmi, Bagnall, Journ. Econ. Biol., 1913, VIII, No. 4, p. 232.
Bagnall, Ent. Month. Mag., 1921, 3. Ser., VII, p. 61.
= *Oxythrips ulmifoliorum* Haliday.

Sc. zeae, Moulton, 1911. — North America.
Moulton, Synopsis, p. 28, 41.
Jones, Bull. Dept. Agric., 1912, p. 15.
Karny, Zool. Ann., 1912, p. 334.
Watson, synopsis, 1923, p. 32, 33.
Is an *Anaphothrips*, belonging to the subgenus *Hemianaphothrips* Pr.

Sc. zuluensis, Faure, 1929. — South Africa.
Faure, Transvaal Univ. Coll., Bull. 18, p. 1, 2, 14.

Centenaire de la Société Entomologique de France (Paris, 16 Juillet, 1932)

Le 16 Juillet 1932, à 14 h. 30, eut lieu l'Assemblée Solennelle du Centenaire de la Société Entomologique de France, dans le Grand Amphithéâtre du Muséum National d'Histoire Naturelle, en présence de Monsieur Albert Lebrun, Président de la République, et sous la Présidence d'Honneur de Monsieur Justin Godard, Ministre de la Santé Publique.

Le programme de cette solennité comportait, entre autres, une allocution de Monsieur le Dr. R. Jeannel, Président de la Société Entomologique de France, un discours de Monsieur E. L. Bouvier, Président Honoraire de la même Société, et une allocution de Monsieur Justin Godard, Ministre de la Santé Publique.

Ces divers discours ont retracé l'historique de la Société Entomologique de France, mis en relief l'importance de l'Entomologie dans la sauvegarde des intérêts de la collectivité dans les domaines économique, agricole et d'hygiène publique, et le rôle prépondérant joué par la Société Entomologique de France à cet égard au cours de ses cent ans d'existence.

A cette occasion, Monsieur A. Alfieri, Secrcétaire Général de la Société Royale Entomologique d'Egypte délégué à la célébration du Centenaire, a remis au Président de la Société Entomologique de France l'adresse qui suit :

Mesdames,

Messieurs,

Au moment du Centenaire de la Société Entomologique de France et à la veille du Vème Congrès International d'Entomologie, je viens vous présenter les chaleureuses félicitations de la Société Royale Entomologique d'Egypte. Je suis heureux de saisir cette occasion pour y joindre les hommages les plus sincères de vos confrères d'Egypte.

Bien des pays possèdent de nombreuses institutions scientifiques permettant au génie humain d'étendre ses conquêtes pour le plus grand profit du progrès et de la civilisation. C'est au vôtre qu'est échu le privilège de posséder, en la Société Entomologique de France, la plus ancienne des institutions scientifiques ayant pour objet l'étude des Arthropodes et plus spécialement celle des Hexapodes.

Dès sa fondation, dont nous fêtons aujourd'hui le Centenaire, les des-

tinées de votre Société s'annoncèrent comme particulièrement brillantes. Latreille, ce savant éminent, l'un des fondateurs de l'entomologie moderne, fut en effet votre premier Président Honoraire. Depuis, les générations successives se sont efforcées de continuer dignement le Maître dont elles avaient reçu de si précieuses inspirations. L'œuvre entière de la Société Entomologique de France est empreinte du même esprit supérieur, vos nombreuses publications, Mémoires, Bulletins et Annales, en constituent la plus brillante illustration.

Un semblable exemple ne pouvait que susciter et entretenir l'émulation universelle. De tous cotés, des centres d'études entomologiques furent fondés et bientôt chaque pays civilisé tint à honneur de posséder une institution du même genre.

L'Egypte, dont le glorieux passé est présent à toutes les mémoires, se devait de prendre part à ce mouvement général. Certes, elle n'aurait pu y manquer tôt ou tard, mais combien d'obstacles lui ont été évités par l'aide constante d'une Dynastie qui depuis un siècle n'a cessé de guider son pays dans la voie du progrès.

Fondée au Caire il y a de cela vingt cinq ans, la Société Royale Entomologique d'Egypte ne tarda pas à grouper une élite de collaborateurs dont le dévouement ne s'est jamais démenti. Elle conservera toujours le souvenir reconnaissant des encouragements inestimables qu'elle reçut lors de ses modestes débuts de la part de toutes ses sœurs aînées et en particulier de la Société Entomologique de France. Qu'il me soit permis de leur renouveler, ainsi qu'aux savants distingués qui nous ont accordé leur concours, tous les vifs remerciements de la Société Royale Entomologique d'Egypte.

Depuis, sous la bienveillante impulsion d'un Souverain si éclairé que l'Institut de France s'honore de Le compter au nombre de ses membres, notre petite Socicété de jadis est devenue une institution largement assise, reconnue d'Utilité Publique et munie de puissants moyens d'étude. Grâce à la sollicitude du grand animateur de toutes les branches de l'activité nationale qu'est S.M. Fouad 1er, Roi d'Egypte, nous avons été mis à même de mener à bien la tâche à laquelle nous nous sommes consacrés : étudier et faire connaître la faune entomologique de la vallée du Nil.

Au matin du 17 Juillet, les délégués des Sociétés et Gouvernements, ainsi qu'un grand nombre de congressistes, se rendirent au cimetière du Père Lachaise pour visiter le tombeau de Latreille, rendant ainsi un nouvel hommage à la mémoire de l'illustre savant qui fût le premier Président Honoraire de la Société Entomologique de France.

V^me^ Congrès International d'Entomologie

(Paris, 18-23 Juillet 1932)

La séance solennelle d'ouverture du Vème Congrès International d'Entomologie, dans le grand amphithéâtre de l'Institut National Agronomique, sous la présidence d'honneur de Monsieur Abel Gardey, Ministre de l'Agriculture, eût lieu le lundi 18 Juillet, à 9 h. 30.

A cette occasion, des quatre coins du globe s'étaient inscrits 162 délégués officiels, appartenant à 41 nations, pour représenter 193 institutions scientifiques intéressées à l'étude de l'Entomologie. Le nombre total des adhérents au Congrès dépassait les 400.

L'Egypte était représentée par Messieurs H. C. Efflatoun Bey et Abdel Megid El Mistikawy, la Société Royale Entomologique d'Egypte par son Secrétaire Général et Conservateur, Monsieur A. Alfieri.

La séance débute par une allocution de Monsieur Abel Gardey, suivie d'un discours de Monsieur Paul Marchal, Président du Congrès.

A la séance du 22 Juillet Monsieur Abdel Megid El Mistikawy a fait une conférence sur le Problème Acridien en Egypte, accompagnée de nombreuses projections.

Notre distingué collègue a notamment développé la part immense prise par le Gouvernement Egyptien dans la lutte contre ce fléau et a insisté sur un point contesté par les acridiologues : le nombre de générations annuelles chez *Schistocerca*.

A la séance du 23 Juillet, Monsieur A. Alrieri a présenté son étude (avec projections) sur une nouvelle maladie du dattier.

JUBILÉ
1907-1932

Pour commémorer un quart de siècle dépensé entièrement à l'Etude de l'Entomologie, science si intimement liée aux intérêts les plus vitaux de l'Humanité, le Conseil d'Administration de la Société Royale Entomologique d'Egypte a décidé d'insérer dans ce Bulletin le manifeste suivant :

«Le 1er Août 1907 fut fondée au Caire la Société Royale Entomologique d'Egypte qui célèbre aujourd'hui ses 25 années d'existence.

En remémorant cette date, vers l'Auguste Majesté du Roi FOUAD Ier, Haut Patron de cette Œuvre, qui Lui doit tout ce qu'elle est, s'élève l'élan de reconnaissance des membres de la Société ; leur pensée se porte aussi, avec déférence, sur l'élite des pionniers de la première heure et sur tous les généreux donateurs qui par leur précieux concours ont contribué à doter la Pays de cette institution scientifique et d'utilité Publique».

Séance du 25 Octobre 1932

Présidence de S.E. le Dr. MOHAMED SHAHINE PACHA, *Président*.

R

Communication

The Skeletal Motor Mechanism of the Thorax of the "Stink Bug", *Nezara viridula* L.

(with Plates XIII-XVIII)

by N. S. R. MALOUF.
The American University.

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I. Introduction

It has become the fashion since the beginning of this century, among students of insect morphology, to make studies of the external features of the thorax of a number of species within a given group with the view of tracing the evolutionary trends exhibited by that group.

A study of the external features of the skeleton as a sole means of comprehending the actual structure is very unsatisfactory. False interpretations are very liable to be made and details are liable to be overlooked. And, above all, no understanding is obtained unless form be inseparably related to function. Although a study of the internal structure of the skeleton is highly desirable, yet even this is inadequate.

While it takes a longer time to trace the paths of phylogeny by means of animals' functionings, the time spent is well worth while and affords a surer and indisputable bases for tracing the trends of evolution. For, after all, organismic evolution, is the process of the development of variations which are manifested in the *gross* functionings and formations of an organism.

This paper in addition to another (1933) which is nearing completion are contributions to the anatomy and functionings of the Hemiptera-Heteroptera : a group meagerly studied as when compared with such orders as the Hymenoptera and the Tyloptera (Odonata).

The writer is indebted to Mr. A. Alfieri and to Prof. H. C. Efflatoun Bey for help in various ways and to the Société Royale Entomologique d'Egypte for allowing full use of the laboratories during the summer months during the time of which most of this paper was done.

II. Material and Technique

The material (*N. viridula* L.) was collected in Marg where it was found in abundance on a patch of bamiah (*Hibiscus esculentus*) between, and including, the months of June to September.

A clump of larvae in the third and fourth instars was found feeding on the stems of *Sesbania aegyptiaca* which was close to the bamiah.

A slit was made in the cuticle and the material was fixed in Carnoy's 6-3-1 for about 24 hours. It was then preserved in 80 per cent alcohol. For dissection, as much of the cuticle as was unnecessary was removed and the whole insect was immersed in Mayer's carmalum overnight only after it had been preserved for no less than a week.

A few minutes were required for destaining in acid alcohol. No. 00 or 0 black pins fitted in needle holders were used for the dissecting which was all done in watch-glasses totally under water. In order to study the musculature of the legs the latter were immersed overnight in diaphanol after which they were put, for about the same length of time in alcoholic eosin so as to stain and harden the tissues. They were then dissected, the cuticle being

now fairly soft. A longitudinal rip of the cuticle of a segment with a needle was the best way of beginning the process. Immersion for three days in diaphanol proved most destructive to muscular tissue. The figures are the writers. Above all things patience is most needful throughout.

III. The Skeleton

A study of the skeleton by itself is necessarily a dry task; for the various developments and peculiarities apparent in each insect have no significance in themselves until their importance in the insect's daily habits become understood. Since, besides support and protection, the skeleton is highly adapted to the necessary movements produced by muscle tension, a study of the musculature is indispensable towards a correct and intelligent interpretation of the parts. A thorough knowledge of the skeleton is necessary, however, before the musculature can be treated.

A. The Prothorax

The prothorax is attached to the head by a fairly ample membrane which is quite devoid of cervical sclereites in this way resembling the Belostomidae, the thoracic skeleton of which was largely studied by Snodgrass (1909). The whole of the anterior margin of the prothorax is evaginated anteriorly (Pl.XIII, fig. 1) so as to cover the posterior margins of the head when the latter is retracted (Pl. XV, fig. 4, *H*). The tergal and pleural regions are not detached from one another as they are in the meso- and metathorax (the same membranes of the latter two forming the wings).

The pleural ridge (Pl. XIII,fig. 1; *PlR*) is only insignificantly apparent in its ventral portion where it is continuous with the pleuro-coxal process, *CxPl*. The pleural suture (Pl. XIV, fig. 2; *PlS*) is the external manifestation of the pleural ridge.The dorsally convex ridge (Pl.XIII, fig.1, *r*; and Pl.XIV, fig.2, *r*) represents, as will be shown further in this paper, the region just below the dorsal extremity of the pleuron.There is also (Pl. XIII, fig. 1) a small dorsally convex ridge, *f*, situated anteriorly in the episternal region, Eps_1. The episternal and epimeral regions of the pleuron evaginate ventrally into two, necessarily double-walled, flaps $EpsFl_1$, and $EpmFl_1$.

The sternum is continuously fused with the pleuron of each side. In the region opposite the coxal process of a side a furca, flattened antero-posteriorly, protrudes internally. As in the more primitive Pterygote condition the furcae are not fused into one as in the more advanced types. Externally the furcal invagination is marked by a pit (Pl. XIV, Fig. 2, *fu*, and Pl. XIII, fig.5).The region of the sternum anterior to that bearing the furcae (Sternellum. see Snodgrass 1929, p. 30) is termed, provisionally, the basisternum (after Crampton 1927, etc.). This is here given for descriptive convenience without

the denotion of a separate « sclerite ». The mesal portion of the basisternum is elevated ventrally (Pl. XIV, fig. 2, Bs_1).

Due to a posteriorly directed flap (Pl. XIII, fig. 1, TFl_1) the tergum may be misapprehended to be very large whereas the actual tergal region is restricted to a narrow dorsal portion, T_1. Snodgrass (1929) calls the ventral wall of this posteriorly directed flap in the case of the grasshopper, a posterior fold or reduplication.

In the bug, however, this flap should not be considered as a reduplication in the sense of the posterior tergal region reduplicating, but, rather, should be considered as a flap-like *evagination* of the tergal region for reasons which will be apparent below. The dorsal tergal flap is continuous laterally with the lateral epimeral flap, $EpmFlL_1$, which is continuous with the ventral epimeral flap, $EpmFl_1$.

Both epimeral flaps are continuous mesally with a double-walled bridge PB, connected with the furcisternum, Fs_1, (Pl. XIII, fig. 5). The pericoxal membrane is continuous, laterally, with the internal walls of the ventral pleural flaps and mesally (P. XIV, fig. 3) with the basi- and furcisternum. Posteriorly, the same membrane is continuous with the anterior wall of the double-walled bridge. This bridge, as postembryonic development shows, should be considered as an evagination from the postcoxal bridge. This description shows the relations of the evagination and the pericoxal membrane bearing in mind that an Arthiopod's cuticle is fundamentally continuous all over. It is quite evident now that if the tergal and lateral pleural flaps be considered as anteriorly directed reduplications of the posterior tergo-pleural regions, when such a concept is extended to the ventral flaps and the posterior double-walled bridge, it fails to explain the relationships of these parts. All these flapular regions should be considered as « evaginatoins ».

One now may logically enquire as to the causes of these cuticular evaginations. The lateral epimeral evagination is a protective cover over the delicate operculum of the mesothoracic spiracle since it overlaps the latter completely concealing it (Pl. XIV, fig. 2). The ventrally directed episternal and epimeral flaps and the evagination of the postcoxal bridge may be considered as developments to protect the pericoxal membrane from injury in foliage. The anterior prothoracic evagination evidently protects the cervical membrane. It should be noted that all these flaps except the last one mentioned direct posteriorly. In the animal's forward progression flaps directing anteriorly would became a hindrance rather than protective coverings for they would be liable to catch into twigs. The cause for an anteriorly directed anterior evagination of the pronotum is quite apparent; for, a posteriorly directed flap from the head, in order to effectively protect the cervical membrane, would have to overlap the anterior margin of the prothorax which would make head movement very awkward. The close fitness of the prothorax

around the posterior margin of the head and the wedge-like shape of the combined head and prothorax reduce to a minimum entanglements which may injure the cervical membrane.

The last regional evagination to consider is the dorsal posterior tergal one. Each is present not only in the Hemiptera but in several other groups of insects in various degrees of development. Concerning the extraordinarily developed posterior protergal evagination of the Membracidae, Weber (1929) makes the following remark : « About the biological significance of this enlargement we know nothing outside of vague conjectures ».

Funkhouser (1915), a specialist on the Membracidae, however, writes : « The adults have the interesting habits of resting on the larger branches (on locust, *Robinia pseudacacia* L.) and on the trunk in rows of from twenty to forty individuals, ranged so close together that their bodies are almost touching and almost invariably with their heads pointing towards the base of the branch, or pointing downward if they are on the trunk. Whether this characteristic attitude is assumed in order to increase their resemblances to thorns and irregularities of growth of their host would be a matter of conjecture ». He further writes : « Birds apparently avoid the insect. No case of their being eaten by birds has been observed in the field, and several handfuls thrown to birds in captivity were refused, although one or two individuals were picked up, only to be dropped again. Evidently the strong pronotal horn and the sharp posterior process (the latter being sharp and hard enough to pierce the skin if the adult insect is suddenly seized) and the hard prothorax are sufficient protection from bird enemies ».

In *Nezara*, the vannal flap, (Pl. XIV, fig. 1, VFl) which is well-developed, liés beneath the posterior pronotal flap when the fore wing is fully flexed. In the flexed condition of the wing the vannal flap would direct anteriorly and might be likely, hence, to catch in foliage during the insects forward progression. While it is true that in several insects which possess a posteriorly directed flap of the prothorax the same does not come within reach of the vannal area to overlap the latter's base, the tendency towards the development of a posteriorly directed flap of the prothorax is only exhibited in some of those insects which flex the wings when at rest (the Neopterygota, according to Crampton's 1926, 1931 classification). The prothorax being an individualized segment in those insects which began to develop the posterior pronotal flap, such flaps were not a hindrance but rather an advantage for they protect the membrane around the anterior borders of the pterothorax.

B. The Pterothorax

In many insects, notably among such which possess a well developed posterior notal evagination of the prothorax, the prothorax is nearly quite detached

functionally from the rest of the thorax which bears the wings and becomes known appropriately as the pterothorax. In the Hymenoptera (see Weber 1927) it is only the sternopleural region of the prothorax which is detached from the rest of the thorax; the prothoracic notum being in close connection with the pterothorax. This individualization of the prothorax is probably in order to afford greater mobility to the fore legs.

The pterothorax, in insects such as the Hemiptera and the higher Hymenoptera, is composed of the mesothorax, metathorax, and a part or the whole of the first abdominal segment. In the former it is a part of thea bdominal segment which has entered into the composition of the pterothorax; in the latter it is the whole. The causes which have led to this modification are different in the two groups mentioned, but it is beyond the scope of this paper to present the evolutionary trends which have led to this modification.

Individualization of the prothorax is carried to such an extent in *Nezara* that while all the nervous ganglia belonging to the segments posterior to the prothorax are fused in a common center above the mesothoracic basisternum that of the prothorax remains wholly individualized.

1. *The Mesothorax*

a. The tergum. — Externally and dorsally Pl. XIV, fig. 1) the tergum presents a well-defined major parapside, *Par*, on each side, which are continuous with one another in the mesal posterior region of the scutum, Sc_2. The parapside of each side is composed of two ridges separated by a non-sclerotized, non-pigmented, and narrow strip (see also Pl. XIII, fig. 2, *Par*). In the median line between both parapsides is a ridge, *m*. Berlese (1909), in one of his diagrammatically colored figures, presents an illustration of *Nezara* and indicates the region included within the major parapsides as the prescutum. This has probably been the source of error followed by others in assigning this region to the prescutum (see Tower 1913, Taylor 1918, Snodgrass 1929, p. 39) although Snodgrass adds : « These ridges and their sutures apparently lie in the scutal region of the tergum, for there is sometimes a narrow prescutal band anterior to their bases ».

Now in Arthropod osteology, if regions of the bodily skeleton are to have names at all these names should be applied to parts which are homologously functional throughout the groups in which they are applied. The prescutum, wherever it be supposed to exist and if its homologues are to be present in different groups of insects, must possess a uniform function throughout these groups, for regions in the Arthropod skeleton are mostly effects of muscular tension.

Dorsal to the region where the tergum extends ventrally to the prealar bridge (Pl. XIII, fig. 3a, Aw_2) there is a well marked suture, *PscS*. This may

be termed the prescutal suture since it demarks anteriorly what is here termed the presental region. This suture does not extend as far mesally as the major parapside of its side. The prescutum is fused, through the intermediation of the prealar bridge, to the episternum, Sps_2. Note that the scutum is propped over the prescutum (see also Pl. XIV, fig. 1, Psc_2).

The tergal longitudinal muscles are attached to the tergum in between the major parapsides (Pl. XV, fig. 4, TL_2). These muscles act as wing depressors. Pressure on the scutum lateral to the major parapsides causes a marked elevation of the wings. The importance of these parapsides is hence extreme, for, if they did not exist the tergal longitudinals too (at least their dorsal fibers) would act as elevators of the wings ! As it is however, the tergal longitudinal muscles increase the dorsal convexity of the mesothorax thus lowering the wings, instead of extending their pressure to the lateral regions (which would elevate the wings) as would be the case if the parapsides did not exist.

If the prescutal suture did not exist the whole tergum would be solidly attached to the pleuron by the prealar and postalar bridges, so that when the tergo-sternal muscles, TS_2, would contract they would produce a diffused reaction in the whole of the pterothoracic region instead of having their force concentrated on the vecta dorsualis anterior and posterior which cause the elevation of the wings (Pl. XIV, fig. 1, *vda*, *vdp*).

The major parapsides afore mentioned do not detach a region from the tergum in order to compensate for the rigidity afforded by the prealar processes. They rather keep within bounds the reaction produced by the contraction of the tergosternal muscles, as is evident by the above mentioned membranous tract included within their ridges. Hence, the parapsides cannot be regarded as bounding a prescutal region. The prescutal region does not have to be a « sclerite » wholly bounded by sutures : it should be considered as a region rather than as a « prescutum ».

The mesothorax of *Nezara* has a well-defined anterior precosta (Pl. XIII, fig. 3a, Pc_1, and Pl.II, fig.1.).The precosta is wide mesally and tapers laterally until it disappears anterior to the prescutal region. The first thoracic phragma, *1st Ph*, is large and bears a median ridge, m^1, which is a ventral continuation of the scutal ridge *m* ; also a transverse ridge, *l*. Besides the major parapsides the tergum has three fairly well marked depressions, *x*,*y*, and *z*. A transverse groove, *s*, limits the posterior margin of the scutum from the scutellum. Internally this groove is manifested as a heavy ridge (Pl. XIII, fig. 2, *s*).

The scutum bears laterally two processes which have been variously termed in different works. The writer gives them the following names. The anterior one, *vda*, is the *vectis dorsualis anterior* ; and the posterior one is the *vectis dorsualis posterior* (vectis meaning a lever, L.). There does not exist a Latin adjective for « tergum » unfortunately, hence, « dorsualis » from « dorsum »

was adopted. Both these processes act as levers, since by the contraction of the tergo-sternal muscles they press downwards upon the dorso-mesal surface of the first axillary (*1Ax*) and act as wing elevators.

The posterior extremity of the scutellum, Sct_2, evaginates in a flap, the scutellar flap, $SctFl_2$, which extends as for posteriorly as the anterior margin of the sixth abdominal tergum.

The postscutellum (Pl. XIII, figs. 2 and 4 : Pl. XV, fig. 1, $Psct_2$) is well developped forming a saddle over which the scutellum rests. It continues laterally to fuse with the epimeron of its segment and is then known as the postalar bridge, Pw_2. The second thoracic phragma is exceptionally developed having a large ventral extension on each side which extends to the sternal furca of its side. The phragma is fused laterally, or, rather, is continuous laterally, with intersegmental region between the meso- and metathorax in which is situated the metathoracic spiracle, for the phragma is itself intersegmental.

b. The Sterno-pleural region. — The pleural regions are lengthened while the tergum is not greatly arched ; this gives the thorax its flat shape. The pleural ridge of the mesothorax is more apparent in *Schizops aegyptiaca* Lef., which has a more sclerotized cuticle than *Nezara*. The pleural ridge is vestigial ventrally (Pl. XIII, figs. 2 and 4, PlR_2) where it is continuous with the pleuro-coxal process, CxP_2. Dorsally, however, it is well developed and bears a dorso-ventrally flattened pleural arm, PlA_2. The pleural wing process PWP_2 is at its dorsalmost extremity. This fits into a concavity formed by the second axillary of the fore wing when the latter is depressed as indicated by the arrow, fig. 8. The episternal and epimeral regions are evaginated ventrally on either side of the coxal process into the episternal flaps forming between them the coxal cleft (1).

A sinuous ridge, *k*, extends anteriorly from the dorsal part of the pleural ridge. From the middle of its larger dorsal convexity a small ridge directs dorsally. Another ridge, *p*, extends anteriorly from the dorsalmost extremity of the episternum ; it is continuous with the ridge of the prealar process, Aw_2. The same ridge also runs ventrally for a short distance along the anterior margin of the episternum.

With regard to the pleuron Taylor (1928) says : « Along the upper margin of the episternum is usually marked off a narrow plate, probably the anterior basalare which has become fused with the episternum ». It was found, in *Belostoma americana*, that the so-called anterior basalare of Taylor as described in this species is merely the area of the episternum bounded posteriorly by the pleural ridge and ventrally by the anterior extension of the pleural arm. What is figured as a subalare in Taylor's fig. 20 is in reality the

(1) The episternal region Eps_2 is much larger than the epimeral region, Epm_2.

ventral part of the third axillary of the fore wing. Throughout Taylor's figures of the external aspects of Heteroptera it may be shown that Taylor's so-called posterior and anterior basalares are bounded by sutures which are outward demarcations of internal ridges such as for instance ridges *p* and *k* (Pl. XIII, fig. 4). The regions these ridges bound are not basalares as will be shown by the musculature. Further, basalares and subalares never fuse with the pleuron; that is they are not original detached plates which adhere to the pleuron. As may be shown by a study of nymphal Orthoptera (see for example Snodgrass, 1929) plates become detached dorsally from the pleura probably as a result of muscle tension and are quite a part of the pleuron in the nymphal period. Such plates may become partly detached but they do not get detached from and then refused to the pleura.

The pleuron is not separated from the sternum by any line of demarcation. In the anterior part of the sternum (Pl. XIII, fig. 4) is a ridge, *r*, which describes a circle anteriorly, runs posteriorly and forms a large flap, $BsFl_2$, the basisternal flap. The posteriorly directed ridges approximate one another on the ventro-medial line. The outward demarcation of this ridge is represented in Pl. XIV, fig. 2, *z*

The sternal intersegmental ridge (Pl. XIII, fig. 2 and 4, AcR_3) which forms the ventral boundary between the meso- and metathorax and which *is continuous laterally with the intersegmental region between the respective pleura.* is well developed although no muscles are attached on it. It acts as a firm brace of the sternal region. The ridge *y* of Pl. XIII, fig. 4 is apparent externally as a depression posterior to the coxa (Pl. XIV, fig. 2, *y*). The sternal furca of each side arises from the lateral part of this antecostal ridge (1) (Pl. XIV, fig. 2 fu_2). This is contrary to what happens in other Pterygote insects with two furcae, according to the writer's knowledge, in which the latter appear to arise from the segments proper, being regarded as secondary ingrowths and not belonging to the primitive intersegmental regions by Snodgrass (1927 and 1929). The region of the sternopleural region containing the ridge *n* (Pl. XIII, figs. 2, 4 and 7) need not be regarded as sternal even though upon this ridge are inserted what are morphologically the sternal promotors of the coxa, $SPrCx_2$. The ridge is in line with the spiracle which is pleural in position.

2. *The Metathorax*

a. The tergum. — The metatergum (Pl. XIV, fig. 1, T_3) appears to be divided laterally into a scutum, Sc_3, and scutellum, Sct_3. Its posterior margin is prolonged laterally into the axillary cord of the hind wing, AxC_3. Mesally Pl. XV, fig. 1) the scutal and the scutellar part of the tergum is non-existent.

(1) Term borrowed from Snodgrass (1927).

What would have been the posterior reduplication of the tergum is flattened out, *PRd*, and is quite fused with the postscutellum, $Psct_3$. The latter is fused to the episternum (an unusual case, the general case being fusion with the epimeron). In *Nezara* the metathoracic epimeron is dorsally inapparent, being now called the posterior bridge (Pl. XIII, fig. 4 Pw_3). The third thoracic phragma (Pl. XV, fig. 1, 3rd Ph.) which makes the intersegmental region between the metathorax and the first abdominal tergum, *Tl* is only fairly developed laterally.

b. The Sternopleural region. — The episternum occupies all but a very small part of the pleura lregion (Pl.XIII, fig.4, Eps_3) which is at the extreme posterior part of the pleuron. It forms ventrally the coxal process, CxP_3. As it runs dorsally it wholly disappears and with it the insignificant epimeron, Epm_3. The pleural suture is not visible externally (Pl. XIV, fig. 2) since it is overlapped by the lateral episternal flap $EpsFlL_3$. That this flap is formed by an episternal and not by an epimeral evagination such as that of the mesothorax, $EpmFlL_2$, is evident since the evagination is formed just anterior to the pleurad ridge (Pl. XIV, fig. 4, $EpsFlL_3$). Ventrally, also the episternum forms a supracoxal flap. $EpsFl_3$. Both the ventral and the lateral flaps are continuous with one another (Pl. XIV, fig. 2). This is further evidence that the lateral flap is episternal.

The sternal furca (Pl. XIII, fig. 4, Fu_3) arises in the lateral part of the basisternal region, Bs_3. Beneath it is the internal orifice of the odoriferous sac, *IO*. Running laterally from this orifice is the tube, *t*, which conveys the liquid to the exterior opening by the external orifice (Pl. XIV, fig. 2,EO). There is no cuticular intervention throughout the tube, the latter being probably an invagination of the cuticle. It will be noted that the basisterna of all three segments all possess the same ventral, posterior bulge.

3. *The First Abdominal Segment.*

The antecostal ridge which separates the metathorax from the anteceding segment or first abdominal segment is continuous with the third thoracic phragma (Pl.XV, fig.1, *1st AcR*). This ridge runs ventrad (Pl.XIII, fig.2 and 4) and fuses with the metathoracic sternum, the sternal part of the first abdominal segment fully incorporating with the sternum of the former. Arising from the dorsal part of the pleuron of the first abdominal segment is a flap which is a cuticular invagination.

Another ridge (Pl.XIII, fig.2, *2nd AcR*) is seen near the posterior margin of the prothorax this is, as will become apparent later, the intersegmental ridge between the sterna of the first and the second abdominal segments. This ridge is not continuous with the antecostal ridge separating the metathorax from the first abdominal segment. A membrane bounds the posterior margin

of the pleuron of the first abdominal segment and dorsally, as the musculature to be mentioned below shows, separates the tergum of this segment in twain. Ventrally, though not well defined, it asunders the sternum of the second abdominal segment as is also indicated by the musculature.

The ridge separating the first and second abdominal sterna disappears laterally as it approaches the membrane mentioned above (see Pl. XIII, fig. 2). As is indicated by myology and innervation (the latter to be described in the winter's future paper (1933) the pleural region posterior to the membrane belongs to the second abdominal segment. It, therefore, appears clear that the antecostal ridge separating the *pleural* regions of the first and second abdominal segments has disappeared in the membrane, in much the same manner as the intersegmental ridge between the labial and prothoracic segments has probably disappeared with the formation of the cervical membranes. The above deductions concerning the morphological nature of the posterioir region of the pterothorax is fully substantiated by a study of the muscles and nerves concerned.

Concluding then, the pterothorax being constricted functionally from the abdomen by a circumlocuting membrane consists of the following : a. mesothorax. b. metathorax. c. first abdominal segment, excepting the posterior part of the tergum which is integrated with the abdomen, and d. half of the sternum of the second abdominal segment which is however not significantly demarked from the posterior half.

The posterior supracoxal flap (Pl. XIII, fig. 4, *IIS* and Pl. XIV, fig. 2.*L*) is an evagination of the sternum of the second abdominal segment. Rudiments of this extension are apparent in the fifth instar larva (Pl. XIV, fig. 9, *SII*) where a ventral bulging is apparent. Hence the coxal cleft of the metathorax is composed of extensions of episternum and of the sternum (or possibly ventral part of pleuron) of the second abdominal segment.

Notwithstanding all that we may conclude with Weber (1929) that the thorax of the Hemiptera is nearer the fundamental insect formation than the Hemipteran head is to that of insects in general.

C. The Postembryonic Development of the Skeleton

There are no marked changes in the sterno-pleural region throughout the five larval stages through which *Nezara* passes. The marked developments which yield the adult insect are all concentrated in the final molt and early adult stage. Pl XVIII, fig. 5, which represents the sterno-pleural region of the second larval instar may be taken as representative of all the larval stages. The ventrally directed pleural flaps are but rudimentary and so they remain till the final molt. The pericoxal membranes are not wholly covered by these flaps. The evagination of the postcoxal bridge of the prothorax is rudimentary.

The anteriorly directed flap of the prothorax which surrounds the posterior part of the head is already well-developed. The spiracles are wholly uncovered and lie in the posterior parts of the segments preceding their own.

The laterally directed flaps between the tergal and sternal regions of each segment are well developed. That of the prothorax is the largest and best sclerotized; that of the metathorax is the smallest and least scelrotized. The dorsal ridges marking the dorsal boundaries of the pleural branches of the depressors of the trochanter are present as they are in the adult.

The mesal part of the sternal region is weakly sclerotized, though in the fifth instar it is clearly representative of that of the adult. The three pairs of sternal furcae are well-developed. The pleural apophysis of the mesothorax which is only very rudimentary in the fifth instar assumes the adult shape in the final molt.

The sternal part of the first abdominal segment has already become fully absorbed into the same region of the metathorax. The pleural region of the same segment, *PII*, is as yet unsevered from that of the second abdominal pleuron, *PIII*. The lateral sclerotizations of the abdominal segments much resemble the lateral growths of the thorax. In the fifth instar (Pl. XIV, fig. 9) the pleura of the first and second abdominal segments have become separated by an intervening membrane, *Mb*.

The development of the terga is very pronounced during larval life. During the first instar the prothoracic tergum is longitudinally broader that both meso- and metathoracic terga together (Pl. XVIII, fig. 3). None of the tergal phragmas are developed beyond the stage of mere ridges for the attachments of the regular dorsal longitudinal muscles. There is no posterior extension of the tergal regions in the first instar.

On the dorso-medial surface of each of the thoracic terga is a seam, *s*, less pigmented than the general coloration of the terga. Thhis marks the line where the old cuticle will split during the molt. The abdominal cuticle remains intact. A transverse split occurs dorsally between the head and the cervical membrane; this continues anteriorly on the anterior margins of the eyes embracing both ocelli.

The tergal development of the second instar does not extend appreciably beyond of the second.

During the third instar the mesotergum begins to direct posteriorly and reaches almost the posterior margin of the metatergum. Foretellings of both pairs of wings are also noticable. The mesotergum is now longitudinally broader than the protergum while the metatergum is the narrowest. Two small ventral extensions of the second thoracic phragma are present. The phragmas are quite flexible and unpigmented. The first abdominal tergum loses its normal identity.

In the fourth instar (Pl. XVIII, fig. 4) the wings become quite apparent. The two ventral extensions of the phragma are pronounced.

During the fifth instar the posterior margin of the mesothorax reaches the posterior extremity of the mesothorax. Both wings now direct posteriorly and extend posteriorly well beyond the second abdominal tergum. The ventral extensions of the second phragmas are more pronounced than in the former instar. The fore wing is all of uniform hard consistency, there being no membranous distal border as in the adult. The distalmost veins which appear detached from the rest in the adult are connected with the main branches in the nymph. It is the dorsal lamella of the fore wing which is hard and pigmented and is easily separable from the ventral softer lamella. Throughout the larval instars the tarsus is only two-jointed, the lost pseudosegment or middle one, being added during the final molt. It is probably detached from the distal pseudosegment, since the main intra-tarsal joint in the adult is between the proximal and middle pseudosegments. The pretarsi are similar to the adult pretarsi.

During ecdysis the old cuticle is shed even from the apodemes to which are inserted the muscles. This includes the long, narrow tendon of the proximal base of the pretarsus and which extends as far proximally as the middle of the femur.

IV. The Musculature

A. The Prothoracic Muscles (Pl. XV, figs 2, 3 and 4)

The special muscles for head movement cannot be given names since by individual action they would produce different head movements than when variously integrated. There are four pairs of such muscles in *Nezara* which are numbered in order from dorsal to ventral :

Muscle 1, originates on the tergum and inserts on the dorsal surface of a lateral, mesal portrusion of the postoccipital ridge, *PoR*.

Muscle 2, thin and delicate, originates on the tergum lateral of M.1 and inserts on the same postoccipital portruberance.

Muscle 3, a horizontal muscle, originates on the extreme lateral, anterior expansion of the prothorax, anterior to ridge *r*, and inserts laterally on the postoccipital ridge and mesal portrusion.

Muscle 4, wide at its base and tapering dorsally, originates on the sternum anterior to the coxa and inserts on the ventral surface of the portrusion, directly opposite M.1.

Tergal longitudinal, TL_1, laterally flattened, originates very close to the next one of its pair on the first thoracic phragma on either side of ridge m^1 (Pl. XIII, 3a) and inserts on the large dorsal part of the postoccipital ridge.,

Sternal longitudinal, SL_1, insert on the ventral part of the postoccipital ridge and originate on the anterior surface of the prothoracic furca.

Tergo-sterno-furcal, TSF_1, a cylindrical bundle, attached dorsally to the ventral knob of ridge *s* of the first thoracic phragma, and ventrally to the prothoracic furca. They indirectly protract the fore legs.

Tergal promotor of coxa, $TPrCx_1$, originate on tergum lateral to the tergal remotors of the coxa and insert on an apodeme which arises from the pericoxal membrane close to the mesal knob of the trochantin (see also Pl. XVI, fig. 2b, which represents that of the metathorax).

Sternal promotor of coxa. $TRrCx_1$, origin on ridge *f* (Pl. XIII, fig. 1) and insertion on apodeme arising from the pericoxal membrane between coxa and trochantin.

Tergal remotor of coxa, $TRrCx_1$, large and powerful, having its flat surfaces facing cephalad and caudad; originates on the posterior part of the tergum and inserts on an apodeme arising from the posterior part of the pericoxal membrane.

Sternal remotor of coxa (not shown in figures), flat; origin on lateral base of furca and insertion on basicoxal ridge.

Depressor of trochanter, has two bodily branches inserting on the same apodeme. The large, flat branch is the pleural branch, $DrTrPl_1$ and originates on the pleuron being bounded dorsally by ridge *r*. The tergal branch, $DrTrT_1$, arises on the tergum laterad of the indirect protractor of the fore limbs PrL_1. It inserts on an apodeme arising from the membrane close to the mesal, proximal margin of the trochanter.

Indirect protractor of fore legs, PrL_1, flat, attached to tergum and directing obliquely ventrad to attach itself to an apodeme arising from the membrane mesal of the prealar bridge (Pl. XIII, fig. 3b, PrL_1). The morphological nature of this muscle is obscure. It is probably correlated with the development of a highly individualized prothorax.

Coxal branch of depressor of trochanter, $DrTrCx_1$, arises on the dorsal mesal border of the coxa and inserts on the same apodeme as the bodily depressors, (Pl. XVI, fig. 1). This apodeme, fig. 5, arises from the membrane and has a club-shaped base which may seat over the dorsal margin of the trochanter as indicated by the arrow.

Levators of trochanter, $LrTr_1$, origin on mesal wall of trochanter and insertion on posterior ridge, *r*, of femur. The femur is only capable of remotion with respect to the trochanter there being a distinctly visible membrane on the posterior side between femur and trochanter. It is not possible for the dissector to promote the femur upon the trochanter.

Levator of tibia, $LrTi_1$, flat, arising on whole of dorsal wall of femur and inserting on an apodeme arising from the articular membrane close above the tibia.

Depressor of tibia, $DrTi_1$, a large muscle arising on lateral walls of femur with some of its posterior fibers originating in the trochanter anterior to the femoral reductors, and inserting on an apodeme arising from the ample ventral articular membrane. This apodeme arises at the proximal base of a sclerotized plate, *pl* (see also fig. 4).

Depressor of tarsus, $DrTar_1$, arises on mesal walls of tibia and inserts on mesal part of the articular membrane between tibia and tarsus. There is no levator of tarsus.

Depressor of pretarsus has two branches which insert on the long, narrow apodeme arising from the proximal base of unguitractor plate, *Upl*. The tibial branch, $DrPtTi_1$, arises on the dorsal head of the tibia, while the femoral branch arises on the dorsal marginal ridge of the femur, *r*, which, as indicated by the broken lines, is a dorsal continuation of the posterior ridge on which the remotors of the femur insert. At the distal base of the tibia is a comb of stiff bristles. *Br.* in between two longer turfts of hair. Using both fore legs in proximity the animal combs its antennae with these while the longer tufts hold the antennae in position.

As is indicated by the stippled areas in figs 6 and 7 the pulvilli are soft distally and ventrally. Dorsally and in the proximal portions they are sclerotized. Each pulvillus is separated from the base of the claw of its side by a narrow membranous strip. The claws articulate dorsally on the last tarsal pseudosegment by single condyles. A ring, *r*, surrounds the distal margin of the last tarsal segment.

B. The Mesothoracic Muscles (Pl. XIII, figs 6 and 7; Pl. XV, fig. 4).

Tergal longitudinal, TL_2, attached anteriorly on first thoracic phragma and most of scutum just lateral to ridge *m* and mesal to the major parapside of its side. Very highly developed, acting as indirect depressor of wings by arching the mesotergum (the hind wing is interlocked with the fore wing — see section on flight.)

Sternal longitudinal, SL_2, attached to the posterior surface of the prothoracic furca and the anterior surface of the mesothoracic furca. It indirectly protracts the fore-legs and makes the ridge on the ventral, posterior margin of the tergal flap to fit into the groove, *s*, as indicated by the arrow (Pl. XV, fig. 4).

Tergal longitudinal oblique, $TLOb_2$, attached dorsally lateral to ridge *y* and mesal to ridge *z*. The ridges are apparent externally as depressions (Pl. XIV fig. 1). Attached ventrally to the lateral part of the second thoracic phragma. Its action is accessory to that of the tergo-sternal and results in wing elevation.

Tergo-sternal, TS_2, large, attaching dorsally just lateral of the major parapside and mesal of ridge *y*. Its ventral attachment is on the basisternum and on the basisternal flap.

Tergo-sterno-furcal, TSF_2, short, dense fibers attached to the ventral surface of the second thoracic phragma and to the dorsal surface of the sternal furca.

Sterno-pleuro-apophysal, $SPlAp_2$, circular, firm, and dense, attached dorsally to the ventral surface of the pleural arm and ventrally on a conical enlargement of a long tendon arising from the latero-anterior border of the sternal furca. The muscles take the conical shape in their ventral attachment. The action of this muscle, as Weber (1929) points out in *Psylla*, is to join the lateral and sternal parts of the segment fully arresting their mutual movement. The mechanical advantage of having the pleural arm arise in the dorsal part of the pleuron is quite apparent. The same muscle in *Tenthredo* sp. (Weber 1927) ends in a lateral tendon of the mesosternal furca and is broad in its pleural attachment. The tendon is much shorter than that of *Nezara*, nervertheless it indicates that in other insects there is a tendency of the fibers to converge upon a single apodeme of the sternal furca.

Tergal promotor of coxa, $TPrCx_2$, flat and broad, arising dorsally between the tergal longitudinal oblique and the ridge *y*. Its insertion is like that of prothorax.

Sternal promotor of coxa, $SPrCx_2$, arising on ridge *n* and inserting like that of the prothorax.

Tergal remotor of coxa, $TRrCx_2$, arising on the lateral, posterior part of scutum, (boundary of origin is indicated by the broken line *b*, Pl. XIV, fig. 1). Its insertion is like that of the prothorax.

Sternal remotor of coxa (Pl. XVIII, fig. 1, $SRrCx_2$) arising on ventral, anterior surface of furca. Insertion like that of prothorax.

Depressor of telopodite, like that of the prothorax the body branches of this depressor are two, the pleural branch being massive, $DrTrPl_2$, arising as far dorsally as ridge *r*. The tergal branch $DrTrT_2$, is long and narrow and arises between the tergal promotor of the coxa and the tergal longitudinal oblique.

First flexor of fore wing, FlW_2, arises on ridge *l*, and inserts on the anterior surface of the third axillary. (see also Pl. XIV, fig. 1).

Second flexor of fore wing, FlW_2, arises on the basicoxal ridge just ventral of the coxal process and inserts on a rather long tendon which is an ingrowth of the ventral membrane of the wing (Pl. XIII, fig. 8, *Ap*). By its tension the processus scutellaris tertius alae is bent at its angle; and, being attached by a ligament, *lig*, to the proximal end of the third axillary the whole fore wing is flexed.

C. The Metathoracic Muscles (Pl. XVII, figs 1, 2 and 3).

Tergal longitudinal, TL_3, small and fan-shaped, attached anteriorly to

the posterior, convex, dorsal wall of the second thoracic phragma and posteriorly to the little developed third phragma.

Tergo-sterno-furcal, TSF_3, long and narrow, arising by a tendon on the lateral part of the third thoracic phragma (see also Pl. XV, fig. 1) and having two ventral insertions (Pl. XVIII, fig. 1). One set of fibers is broad and inserts on the odoriferous sac close above the internal orifice. The other set of fibers insert on a tendon which arises between the membranous sac and the base of the furca. Both these act as dilators of the membranous, odoriferous sac. It is serially homologous with the same muscles of the pro- and mesothorax since they all originally have their ventral attachments on the dorsal surface of the furca.

Tergal promotor of coxa, is divided into three branches all of which are inserted on a single apodeme with a similar position as those of the pro- and mesothorax, (Pl. XVI, fig 2b). $TPrCx_3$ *1+11* (Pl. XVI, fig 2a) insert on the broad part of the apodeme; $TPrCx_3{}^1$ arising on the lateral ventral part of the second thoracic phragma (Pl. XVII, fig 1), and $TPrCx_3{}^{11}$ arising on a ridge of the posterior wall of the phragma. The fibers of $TPrCx_3{}^1$ continue with their origin anterior to $TPrCx_3{}^{11}$.

$TPrCx_3$ inserts on the branch *y* of the main apodeme (Pl. XVI, fig. 2b) and arises on the anterior part of the metathoracic tergum.

First sternal promotor of coxa (Pl. XVI, fig. 2a, $SPrCx_3{}^1$) flat and thin, inserts on the anterior side of the base of the apodeme upon which the tergal promotors insert, and arises on the intersegmental ridge lateral of the mesosternal furca (Pl. XVII, fig. 1).

Second sternal promotor of coxa, $SPrCx_3{}^{11}$, inserts on the trochantin and arises on the same ridge as the first but more lateral.

Third sternal promotor of coxa, $SPrCx_3$, inserts on an apodeme arising from the membrane between the coxa and the trochantin and is hence serially homologous with the sternal promotors of the pro- and mesothoracic segments. All three promotors present the appearance of a single, flat, wide muscle.

Tergal remotor of coxa is divided into two branches which insert on an apodeme similar in postiion and structure to those of the two anteceding segments. This apodeme Ap^1 (Pl. XVI, fig. 2a) has a knob-like prominence at its base facing anteriorly. The knob is caused by a depression in the posterior wall of the apodeme (fig. 3, *Ap*) and articulates on a dentition of the basicoxal margin.

$TRrCx_3$ arises on the tergum posterior to the tergal promotor and the tergal branch of the depressor of the telopodite $DrTrT_2$.

$TRrCx_3{}^1$ (Pl. XVII, fig. 3) arises on the posterior surface of the lateral part of the second phragma.

Sternal remotor of coxa, $SRrCx_3$, arises on the posterior surface of the sternal furca and inserts similary to those of the preceding segments.

Depressor of Trochanter, has two body branches.

Both branches have insertions similar to those of the anteceding limbs. The long, narrow, tergal, $DrTrT_3$, arises on the anterior part of the tergum just mesal of the tergal promotor of the coxa. The large, powerful, pleural branch arises on the episternum being bounded dorsally by a ridge similar to those of the meso- and metathorax (not shown in figures).

Depressor of Posterior margin of hind wing, DrW_3, arises (Pl.XVI, fig. 2a) similarly to the second flexor of the fore wing, and arises on the apodeme which is an invagination of the membrane at the base of the hind wing (Pl. XIII, fig. 4, Ap_3). This muscle is serially homologous with that of the mesothorax having a similar origin and insertion, but is absent in the prothorax.

Flexor of hind wing, FlW_3 (Pl. XVII, fig. 2), arises in a nook of the episternum dorsal to the metathoracic spiracle, fig. 5, x, and inserts on the mesal surface of the third axillary (see also pl. XIV, fig. 1). It is serially homologous with the first flexor of the fore wing having a similar origin and insertion.

The intrinsic leg musculature is the same in all three segments. The tibia and femora of the hind limbs are longer than those of the two preceding limbs, while those of the middle limbs are longer than those of the fore legs. This affords greater leverage for the leap into flight which is performed by the middle and hind legs.

D. The Spiracular Muscles.

1. *The Mesothoracic Spiracle* (Pl. XIV, figs 5 and 6). — That this spiracle belongs to the mesothorax is not only borne out by the embryological studies of various writers but the present writer (1933) finds that its muscle is innervated by a mesothoracic nerve.

The spiracle lies in the membrane just anterior to the mesothoracic pleuron, fig. 6, and is in line with the ridge, r, upon which the sternal promotors of the coxa arise. The spiracle is overlapped externally by the lateral, epimeral flap of the prothorax. The operculum, Op, has a ventral extension, Ex, on which are inserted the occlusor muscle fibers. $OcSp$. The fibres arise on the ventral margin of what may be termed, a peritreme. The free margin of the operculum is thickened by a rim which gives solidarity to the delicate operculum which is in reality an evagination of the tracheal invagination. The spiracle opens directly into a large air sac. The length of this spiracle is about 0.9 mm. in the male. Hairs guard the entrance of the spiracle, (fig. 5).

2. *The Metathoracic spiracle* (Pl.XVII, fig.5 and 6).—It is intersegmental in position but its muscle is supplied by a metathoracic nerve. Like that

of the mesothorax, its operculum has its convex surface facing externally. The spiracle is overlapped by the lateral, epimeral flap of the mesothorax. Close to the free margin of the operculum, fig. 6, is a stiff, white ridge which gives solidarity to the operculum besides directing the tension of the occlusor muscle, $OrSp_3$. The latter is inserted on a flat, sclerotized surface of the operculum and arises in a fork formed by a ventral meeting of intersegmental ridges. In the state of occlusion the free surface of the operculum lateral to the stiffening ridge is extal of the posterior intersegmental ridge. The length of the spiracle is about 1.4 mm. in the male. There are hairs on the epimeral flap which help guard the entrance of the spiracle (Pl. XIII, fig. 4). The spiracle opens directly into a large air sac. Both meso- and metathoracic spiracles open by their own elasticity.

3. *The Abdominal Spiracles* (Pl. XVIII, figs 1 and 2). — Spiracles occur on the second to the eighth (inclusive) abdominal pleura of the female and on the second to the seventh abdominal pleura of the male. This difference is due to the fact that the seventh segment of the male is retracted into the genital chamber. The spiracles of the eighth abdominal segment in the female are, however, smaller than those anterior and have a small trachea issuing from them with no direct connection with an air sac.

The mechanism of an abdominal spiracle is quite the reverse of that of a thoracic spiracle for in the former the spiracle is dilated by a muscle and closes by its own elasticity. The operculum bears a ventral extension on whose ventral wall are inserted the dilators of the spiracle. The fibers arise anterially on a ridge, *r*, whose position is seen externally, fig. 1. The opercula of all the spiracles may be seen to open and shut in a living individual. The action is irregular. The spiracles lie in the anterior parts of the abdominal segments.

E. The Musculature of the First Abdominal Segment.

Tergal longitudinal, TLl, (Pl. XVII, fig. 3) attached anteriorly to the third thoracic phragma, lateral of the tergal longitudinal of the metathorax and posteriorly to the antecostal ridge separating the first abdominal tergum from the second. There is an ample membrane separating the thoracic part of the first abdominal tergum, *TI* from the abdominal part, TI^1, of the same. This muscle is innervated by a nerve belonging to the first abdominal segment.

The *sternal longitudinals* have disappeared with the complete amalgamation of the first abdominal sternum with the metathoracic sternum and the consequent disappearance of the antecostal ridge separating the respective sterna.

Lateral compressors, LCrI, are attached dorsally to the abdominal ter-

gum and laterally to the internal flap of the pleuron of the same segment. This muscle is further evidence that the region here termed the abdominal part of the first abdominal tergum belongs to where it is named. This muscle is innervated by a nerve pertaining to the first abdominal segment.

Similar lateral compressors (fig.4) are situated in each abdominal segment as far as the seventh (inclusive) each being innervated by the nerve of its own segment. Their positions are just posterior to the spiracles of their own segments. Externally their places of attachment are marked by transverse depressions (Pl. XIV, fig. 1. *j*; and Pl. XVIII, fig. 1, *p*) which are of a lighter pigmentation than the general cuticle.

The *tergal longitudinals* of the second abdominal segment, *TL II*, have similar attachments as those of the preceding segment, and there are no tergal longitudinals posterior to them in the visceral segments, the terga being firmly welded together.

Such is also the case with the *sternal longitudinals* of the same segment, SL II, the visceral sterna being immovably adherent.

The sternal longitudinals are innervated by a nerve belonging to the second abdominal segment (1933). All this fofrs conclusive evidence of the truth of the statements made in the third section of « The Pterothorax ».

F. The Postembryonic Development of the Musculature (Pl. XVIII, figs 6 and 7)

All instars from the second (inclusive) through the fifth or final instar were studied. Since the musculature of the above larval stages was not found to differ quantitatively from stage to stage it is extremely improbable that the first instar will show any differences. The great changes that occur which distinguish larva from adult are concentrated in the final molt and in the immature adult (1).

The trunk muscles of the legs, the intrinsic muscles of the same, and the muscles for head movement, are the same in larva and adult. The tergal longitudinals are present, those of the mesothorax being small relative to the adult condition; while those of the metathorax, TL_3, are not condensed and fan-shaped as in the adult but are primitively spread out. As in the adult there are no tergal longitudinals posterior to those of the second abdominal segment.

There are tergal longitudinals, TL_2, present in the larval stages which are attached to the second thoracic phragma but which attach midway on the tergum. It is hardly possible that these represent the tergal longitu-

(1) Unless specified the term 'adult' refers to the fully mature insect rather than to the newly emerged adult which is here termed the « immature adult ».

dinal obliques of the adult since they are mesal to the tergal longitudinals, TL_2.

The pro- and mesothoracic sternal longitudinals are as in the adult. The adult has, however, lost the metathoracic sternal longitudinals $SL^1{}_3$ which extend between the metathoracic furca, Fu_3 (Fig. 6) and the antecostal ridge, *1st AcR*, separating the metathoracic sternum from the *first* abdominal sternum. There are no sternal longitudinals stretching between the 1st AcR and the 2nd AcR (the ridge separating the first and second abdominal sterna), the sternum of the first abdominal segment being immovably fused with the metathoracic sternum. As in the adult the mesal part of 1st AcR is entirely absent, the antecostal ridge turning anteriorly around the mesal part of the sternum which surrounds the hind coxa and meets the metathoracic furca.

Contrary to the adult condition the larval stages possess sternal longitudinal muscles throughout the visceral segments, those of the second segment, *SL II*, are shorter than the rest. They consist of a single layer of fibers. It is to be noted that the sternal longitudinals of the metathorax are divided into two, SL_3 and $SL^1{}_3$, by the metathoracic furca, Fu_3.

The condition in *Nezara* is at variance with the results of Morison (1927) on the adult honeybee, and of Weber (1929) on the nymph of *Psylla mali*, which indicate, as pointed out by Snodgrass (1929, p. 25), that the posterior sternal longitudinal muscles of the thorax extend between the furca of the metastrnum and the antecostal ridge anterior to the *second* abdominal segment. The writer, fully realizing this variation in *Nezara*, took special pains to locate the attachments of $SL^1{}_3$ with accuracy. They were found to attach anteriorly on the posterior surface of the metathoracic furca and posteriorly on the antecostal ridge separating the metathoracic sternum from the *first* abdominal sternum, just posterior to the hind coxa. They are entirely separate from the sternal remotors of the coxa, which, as in the adult, arise on the posterior surface of the metathoracic furca (in the larva arising lateral to the posterior sternal longitudinals of the metathorax $SL^1{}_3$).

In the immature adult the posterior sternal longitudinals of the metathorax, $SL_3{}^1$, and the sternal longitudinals of the visceral segments of the abdomen are still present; while the tergo-sterno-furcal of the metathorax is still attached ventrally on the dorsal surface of the metathoracic furca, there being as yet no odoriferous sac.

The mesothoracic tergo-sternal muscle. TS_2, is a narrow columbar set of fibers. Its sarcostyles are unstriated and the numerous nuclei bulge in the external sarcoplasm.

The sterno-pleuro-apophysal muscle, $SPlAp_2$, is relatively longer and narrower than that of the adult and even in the fifth instar (fig. 7) is attached

dorsally to an insignificant enlargement of the ridge *r* to which the pleural branch of the depressors of the trochanter are dorsally attached. In larval forms this muscle is unstriated, and the nuclei appear in the outer sarcoplasm.

The tergo-sterno-furcal muscles, TSF, all attach dorsally on the antecostal ridges (phragma) as in the adult and ventrally on the dorsal surfaces of the sternal furcae. That which is attached on the metasternal furca differs from the adult in that in the adult it has its ventral attachment on the odoriferous sac as previously described. Note that in the fourth instar, fig. 6, the mesothoracic tergo-sterno-furcals are longer, relatively, than those of the fifth instar, fig. 7, and that inversely correlated with the lengths of these muscles are the lengths of their respective phragmas. The writer would say with Weber (1929. p. 148) « one feels tempted to say that they build through their tension the phragma ». A similar statement may be made concerning the prothoracic tergo-sterno-furcals, about the mesothoracic sterno-pleuro-apophysals, and about the tergal promotors of the coxa of the hind leg which are attached on the ventral, lateral part of the second phragma.

In *Psylla mali*, the object of Weber's (1929) study, the phragmas do not exist as such even as late as the fourth instar. They are probably formed by the tension of the tergo-sterno-furcal muscles which Weber regards as intersegmental in nature (« M. dorsoventralis intersegmentalis »). In *Nezara*, however, from instar to instar the gradual influence these muscles apparently have over the development of the first and second phragmas is evidenced. It is apparent from the measurements tabulated below that the length of the muscle whose tension is supposed to produce the second thoracic phragma varies inversely with age and its diameter directly with age. This indicates progressive contraction.

The mesothoracic tergo-sterno-furcals :—

	4th instar	5th instar	adut (mature)
Length	0.5 mm.	0.333 mm.	0.24 mm.
Diameter	0.008 mm.	0.0096 mm.	0.0096 mm.
Distance between telophragmata ...	0.0064 mm.	0.0064 mm.	0.008 mm.

While the mesothoracic sterno-pleuro-aphysals of the adult are one and six-tenths times greater in diameter than those of the fifth instar they are nevertheless equal to each other in length. No striations could be detected in the tergal longitudinals, tergo-sternals, and sterno-pleuro-apophysals of the fifth instar. In all the muscles examined both in the larvae and in the adult,

the nuclei lie in the superficial sacroplasm, those of the tergal longitudinals and tergo-sternals being very prominent.

Other differences in the muscular system which characterise the larvae from the adult are the first and second flexors of the fore wing, the flexor of the hind wing and the depressors of the posterior margin of hind wing. It is very probable that the second flexors of the fore wing and the depressors of the posterior margin of the hind wing are directly derived from bundles of the pleural branches of the depressors of the telopodites of the middle and hind limbs, respectively. The lateral, mesal extension of the coxa at the base of the pleural coxal articulation, on which the above two muscles take their origins on their respective coxae, is not present in the fifth instar. Hence, it may be surmised that this mesal extension effects the detachment of a bundle of the pleural branch of the depressor of the telopodite from the apodeme to which the latter is attached.

The mechanism of both thoracic and abdominal spiracles is the same in adult and larvae, as are the lateral compressor muscles of the abdomen.

V. The Wings and their Mechanism

A. The Wing Axillaries and Venation
(Pl. XIV, figs 8 and 9; Pl. XIII, figs 1 and 3)

The venation of the fore wing is almost typical. The coxa, *C*, is large and marginal. The subcosta, *Sc*, is unbranched. The proximal part of the radius, *R*, is large. It appears to disappear just distal to its distal portion; it soon reappears, fig. 3, and divides distally into two branches : the first radial R_1, and the radial sector *Rs*.

Posterior ([1]) to the radial vein is a narrow membranous strip, the median furrow of Comstock (1918). Forming the posterior boundary of this furrow is the median vein, *M*, which is fairly large proximally. Then follow the first and second cubitals, the latter forming the anterior boundary of the plica vannalis ([2]), the « clavusnaht » of German Hemipterists, and the anal furrow of Comstock. Comstock (1918) writes: « In fact in all the Heteroptera that we examined, when an anal furrow is distinctly developed it is in front of the cubitus ». Snodgrass, however, (1927, 1929, 1929 a) adopts a very satisfactory functional system regarding the nomenclature of the wing veins. The anals are a natural group connected with the third axillary and hence lie posterior to the plica vannalis since the wing bends in this region with the anterior tip of the third axillary causing this bend. The anals posterior of

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([1]) Wings described as when set at right angles to the long axis of the body.
([2]) Morphological term of Snodgrass (1929).

the plica vannalis Snodgrass terms « vannals ». While in *Nezara* they do not open into a fan distally, they do so in such families as the Capsidae, Anthocoridae, Belostomidae and Coreidae. This is connected with the development of the scutellum, since the wings when flexed have their posterior margins against the scutellum. *Nezara* has three vannals ; the anterior two fused distally. As is shown by Hoke's (1926) figures the veins in the distal membranous area of the fore wing are the branches of the main veins which have apparently become detached from the latter by the sclerotization of a part of the wing. The area bounded posteriorly by the median furrow is known by Hemipterists as the embolium. The area posterior to the median furrow is the corium ; while that posterior to the plica vannalis is the clavus.

What may be a distal remnant of the costa in the hind wing forms a sliding ridge for the coupling flaps of the fore wing. The writer could find no costal trachea in the fifth instar. Basally the large axillary fig. 1, $C+Sc+R$, may be the proximal union of the costa, subcosta, and radius. The small stub, C, may be the detachment of the costa from the combined subcosta and radius. The latter separate distally. The median furrow is posterior to this compound vein. The median vein runs ventrad as is shown by studies of larval wings of *Apateticus* sp. (Hoke 1926). The nomenclature of the median veins is adopted from Hoke. There are two cubitals and one vannal vein. The folds, *f*, and the jugal fold, *JF*, have their apices directed laterad during wing flexion, thus being opposite to the plica vannalis.

The humeral axillary, HAx_2, of the fore wing is large and is connected by strong membrane to the dorsal part of the mesothoracic sternum. The first axillary, *1Ax*, is overlapped mesally by the vecta dorsualis anterior and posterior, *vda* and *vdp* (see also Pl.XIII, fig.2). Laterally it extends mesad and posteriad of the second axillary portion of the radial vein forming with it the principal hinge between the wing veins and the axillaries. The second axillary, like the humeral and third axillaries is apparent on the ventral side of the wing (fig. 8). In the concavity formed by the dorsal wall of the second axillary the pleural wing process fits when the wing is depressed and extended, as indicated by the arrow. Just distal to the second axillary is a median axillary which is loosely connected with the second axillary. The third axillary, (Pl.XIV,*3Ax*), is elongated and is bent at an angle beneath the vannal flap, *VFl*. It appears, however, that this last axillary is double since their is a rough articulation between the bent part and the straight proximal part. Such is, also, the case in the Belostomidae (see Snodgrass 1909) and in cicada as will be shown later. In all three cases it is upon the proximal division of the axillary that the flexor muscles, FlW_2, are inserted. The curved distal part is concealed beneath the vannal flap and hence serves to elevate the vannal region as the wing is being flexed upon the thorax. The detachment

of the distal part offers greater flexibility during the movements of flexion and extension. An anterior prolongation of the scutellum, PSA_2, is termed variously by different writers (hinteres tergales Flugelgelenk, by Weber; and posterior notal wing process by Snodgrass). Since it is invariably related to the third axillary and to the scutellum the writer preferes the term, *processus scutellaris tertius alae*. In *Nezara*, however, this process extends to the ventral membrane of the wing (fig.8,PSA_2) forming a joint lateral of which the membrane invaginates into an apodeme, *Ap*, to which are inserted the second flexors of the fore wing. The membrane joining this joint to the mesal part of the third axillary is thickened into a ligament, *lig*. In fig. 8 the flexor muscle is contracted since the joint shows a dorsal concavity. In fig. 9 which belongs to *Shizops aegyptiaca*, a more sclerotized form, the joint presents a dorsal convexity which signifies that the flexor muscle was relaxed and the wing was extended. The humeral axillary of the hind wing appears to consist of the combined coxa, subcosta, and radius. Hoke (1926) writes that in *Chlorochra sayi* Stäl there are three strong tracheae present in this strong vein. The first axillary, *1Ax*, is small and attached to the anterior, lateral extremity of the metatergum. Laterally, it is in close proximity to the anterior end of the second axillary, *2Ax*. The latter forms with the humeral axillary the principal hinge of the wing. This is further evidence that the humeral axillary contains a radial element, for the radius and the second axillary form the principal wing hinge, (Snodgrass, 1929 a). The part of the second axillary which is evident ventrally extends below the flexor muscle of the wing, as shown by the broken line in fig. I ((see also fig. 8). There are some medial sclerotizations of the wing. The third axillary has three arms. To one arm are attached the fibers of the wing flexor. The arm directing distad forms the plica vannalis during flexion; while the arm pointing mesad articulates with the second axillary.

B. Flexion

Flexion is that type of wing movement which results in the wings being folded over the thorax and abdomen. Both wings flex separately.

1. The Flexion of the Front Wing.

The pressure of the humeral axillary upon the upwardly projecting portion of the mesothoracic episternum, and the pressure of the second axillary upon the humeral axillary and the basal part of te radial vein, are probably the main factors which give the wing elasticity to flex without the intervention of muscular activity. After severing the contact between the third axillary and the ventral extension of the processus scutellaris tertius alae (Pl.XIII,fig.8, *lig*) and also after totally removing the third axillary, the wing flexed by its own elasticity to this same position relative with the thorax as with the un-

impaired wing. This clearly indicates that the first and major part of the flexion of the fore wing is independant of muscular contraction but is due to the above mentioned causes. When the posterior margin of the vannal lobe forms an angle of about 45° with the mesothorax, the second axillary becomes pushed mesally by the proximal portion of the radial vein (due to fairly ample membrane (see Pl. XIV, fig. 1) the second axillary did not until now come under the influence of the proximal portion of the radial vein) and the distal portion of the second axillary is swayed slightly posteriad. The pressure of the second axillary upon the first axillary pushes the dorsal margin of the latter upon the scutum, although the first axillary is in a more or less perpendicular position even in the extended wing.

The median axillary folds at right angles to the second axillary and swings mesally as the pressure of the proximal portion of the radial vein is exerted upon it.

The processus scutellaris tertius alae is in a nearly vertical position, while the third axillary swings upon the ventral end of the former turning perpendicularly and elevating the vannal region. The final flexion is brought about by the two flexor muscles described above and the wing is brought to rest. In the state of complete flexion the first axillary, like the third axillary, is in a perpendicular position, whereas the second axillary remains in a horizontal plane. This position of the axillaries when the wing is in full flexion is typical, according to Snodgrass' (1929a) exposition of the wing mechanism.

When the fore-wings are at rest the distal membranous area fo the right fore wing is usually above that of the left forewing, the sclerotized parts of the wing coming short of overlapping quarters. Both membranes are overlapped by the scutellar flap. The same individual was seen to vibrate the wings and fold the right fore wing upon that of the left, and vibrate them again and fold them vice-versa. The posterior extension of the mesothoracic scutellum and its flap is an adaptation to protect the membranous areas of the fore wings from foliage.

The lateral walls of the abdomen of *Nezara* extend above the lateral margins of the fore wings thus preventing the wings from being displaced laterally by twigs. A final adaption towards perfect flexion is the lock formed by the proximal part of the coxal and subcostal veins and the open split of the lateral evagination of the epimeron, afore described. This lock consists of a lobe (fig. 8, x^1) which directs mesally when the fore wings are flexed and which is formed by the meeting together of the costal and and subcostal veins. This wing lobe fits beneath a lobe x, within the epimeral evagination. Meanwhile the ventral, proximal portion of the costal vein, K, fits into the split of the epimeral evagination. The flexor muscles having accomplished their task may now no longer contract.

2. *The Flexion of the Hind Wing.*

Even in the state of extension the small first axillary is nearly perpendicular. During flexion it is made more thoroughly so by the pressure of the second axillary upon its mesal border. The third axillary swings perpendicularly drawing the first and second cubital veins mesally.

The first cubital (Pl. XIV, fig.1, *1Cu*) being connected with the proximal portion of the large anterior vein which is composed, as before mentioned, of $C+Sc+R$, swings this large vein through its principle hinge with the axillaries at right angles to the second axillary. The pressure caused by this hinge upon the second axillary causes the latter to swing perpendicularly bringing its lateral margin mesally. This meanwhile swings the first axillary against the metathoracic tergum.

When the third axillary swings perpendicularly it causes a fold at its distal apex and which extends across the wing in between the second cubital and the vannal vein. This fold Snodgrass (1929a) gives the significant name of vannal fold or *plica vannalis*. This is the chief fold of the wing and is the most mesal part of the wing when the wing is fully flexed. The vannal vein and the second cubital vein are so related to one another that it is also by their passive action that the vannal fold is so well executed.

The second axillary, even when the wing is fully extended is not quite horizontal. *Snodgrass' triangle* (1929a) is particularly evident in the flexion of the hind wing. The distal apex being formed by the distal apex of the third axillary, the anterior apex by the hinge of $C+Sc+R$ upon the second axillary, which is the chief wing hinge, and the posterior apex at the region where the axillary cord proceeds from the posterior margin of the metathoracic tergum.

In the figures of the wing axillaries Snodgrass' triangle is indicated by the crossed, broken lines. Its anterior angle should always be at the principle hinge between the veins and the axillaries; its lateral angle should be at the proximal margin of the plica vannalis; and its posterior angle should mark the bend formed by the posterior, mesal tip of the third axillary with the wing membrane during flexion.

The final flexion is brought about by the contraction of the flexor muscle which inserts on the posteriorly directed arm of the third axillary. In the state of rest the left hind wing usually lies above the right, the mesal areas of the wings being covered by the posterior reduplication of the scutellum. Since the hind wings are kept in position by the fore wings which overlap them there is no lock between the hind wings and the trunk.

C. Wing Extension and Flight.

Before taking to flight from the substratum *Nezara viridula* walks, or

rather scampers, forward and then stops to bring its hind tibiae perpendicular to the long axis of its body and at right angles to their respective femora; it then raises its front legs with their tarsi firm on the substratum, plants all its tarsi firmly on the surface and then *leaps* into buzzing flight. All three legs were encroached and in the same symmetrical relation on both sides to one another and to the trunk (thorax and abdomen). This symmetry enables the vector to be continuous with the median plane of the body when the insect takes to flight. Both fore legs were severed at the proximal base of the femur. There was no marked difference from the normal in starting off into flight from the substratum. With both fore legs and one middle leg severed at the proximal bases of the femora starting off was a little more difficult since it was difficult to bring the hind leg on the side of the two severed limbs to the same relations with the body mentioned above. It is possible to take to flight with only the hind legs, the other limbs being cut at the proximal bases of the femora.

Starting off into flight was accomplished more easily with only the middle legs left intact than with only the hind legs since they are probably nearer the center of gravity of the body hence it was easier to bring them to the positions described above. Flight from a substratum was wholly impossible with only the three legs of a side left intact or with no legs at all. The wings may vibrate though, when all the legs are severed. With all the legs severed at the bases of the femora *Nezara* can fly after falling some distance through the air, although such individuals fall a greater distance than the normal insects before taking to flight. Steering was accomplished as in the normal in this last case. The significance of these experiments will become apparent below.

The dorsal part of the mesothoracic episternum projects dorsad and laterad of the ventral margin of the mesoscutum (Pl.XIII, fig.). Strong membrane unites the humeral axillary of the fore wing to this part of the mesepisternum (Pl.XIII, fig.8, Mb^1). During the contraction of the powerful pleural branch of the depressor of the telopodite of the second limb the telopodite is violently depressed, and in addition to the tension of the depressors of the tarsus and pretarsus and tibia (the former obtaining a certain grip of the substratum and some leverage, and the latter supplying great leverage) the animal is flung upward into the air. Due to the similar simultaneous action of the hind limbs, whose segments are longer than either of the front pair thus giving greater leverage, the total effect is an upward forward spring. But, since the same depressor muscle of the trochanter is attached to the sinuous ridge (Pl. XIII, fig. 7) which is in the dorsal part of the mesepisternum, the fore wing, through the medium of the strong membrane afore mentioned, is extended having its front margin depressed and pronated. Due to the fact that most of the fore wing is hard in consistency, the whole of the fore wing

up to the line of flexibility, the plica vannalis, may be said to undergo depression and pronation. The distal membranous area of the wing not being able to overcome the resistance of the air, would flare up. Thus, the spring and the extension of the fore wings are effected simultaneously by the same great muscle.

The hind wing possesses no muscle of extension and pronation, the massive pleural branch of the depressor of the telopodite of the hind wing, although attached dorsally to a ridge homologous with that of the mesepisternum, cannot act as wing extensor due to the anterior position of the anterior margin of the hind wing (Pl. XIII, figs 4 and 8). There is, however, a coupling apparatus (Pl. XIV, fig. 4) which is composed of a pair of flapular, ventral evaginations of the vannal veins. The anterior flap, *(1+2) VFl*, emerges from the combined first and second vannals. The posterior flap is produced from the third vannal vein, *3VFl*. When the fore wing is extended by the above mentioned causes. These two flaps inevitably clasp, what may be the distal remnant of the costal vein, and slide along this vein when the fore wing is further extended thus extending the hind wing simultaneously.

The fore wing possesses no muscle which can depress its posterior border while the hind wing possesses no muscle to depress and extend its anterior border.

The muscle attached to the apodeme which is an invagination of the posterior part of the ventral membrane of the hind wing, *Ap*^{3} (Pl. XIII, fig. 4) and (Pl. V, fig. 1) acts as depressor of the hind margin of the hind wing as may be mechanically observed on a rather freshly preserved individual.

Both wings, thus, in the mechanism of flight, act as a *single* wing. At the start the pleural branches of the telopodites of the three limbs and the tergal longitudinals of the mesothorax contract, this results at once in extension and downward motion with pronation and depression of the front margin of the fore wing. When the insect leaps it flies; that is, all these factors are momentous. A momentous vacuum being created above the insect by the downstroke causes the insect to move upward and replace that space. Meanwhile, the air which has been compressed beneath the animal flares out posteriad. The hind margin of the fore wing posterior to the plica vannalis and the whole of the hind wing, being unable to resist the air pressure from beneath flare upward. Thus the portion of the fore wing anterior to the plica vannalis is the functional remigium (oar). The wing area posterior to the plica vannalis, which includes the posterior margin of the fore wing and the whole of the hind wing is the vannus (remigium and vannus are adopted from Snodgrass' terminology, 1929 a).

The tergo-sternal muscles of the mesothorax then contract and together with them the depressor of the posterior area of the hind wing. This causes the vecta dorsualis anterior and posterior (Pl. XIV, fig. 1, *vda*, *vdp*) to press

against the dorsal mesal surface of the first axillary thus, elevating the wings. This may be demonstrated mechanically. The fore wing with its coupling apparatus carries the hind wing up with it, the latter having its posterior margin depressed by the muscle afore mentioned. Progression is forward and downward now. The important fact to note throughout is that both wings function as one.

The mechanism of wing extension and flight in the Belostomidae is similar to that of the Pentatomidae judging solely from the former's musculature and structures. Due to the manner of the locking apparatus of the fore-wing upon the thorax in the Belostomidae it does not appear possible that they can extend their wings without previous further flexion of the fore wings.At least such is what is the case in a dead specimen when one attempts to extend the wings when perfectly locked with the thorax, and is clearly borne out by the structure of the locking apparatus. Torre-Bueno (1913) makes the statement that the thoracic limbs of the Belostomidae are as useless for walking as the wings are efficient for flying. Since such is the case it would be interesting both from the phylogenetic and mechanical standpoints to observe how aquatic Heteroptera start off to flight. The aquatic Heteroptera also possess the large mesothoracic trochanteral depressor which acts as depressor of the fore wings in exactly the same fashion as in *Nezara*.So, undoubtedly starting off into the air must be connected with limb movement even if it be a jerk from the water.

The ventral evaginations which make up the coupling apparatus of the fore wing of the Belostomid, *Amorgius niloticus*, emerge from the second and third vannal veins (Pl. XIV, fig. 5) ; the first vannal not being fused with the second as in *Nezara*.

It has been known that leaping into the air has a close connection with flight and the development of wings. Crampton (1916) in his masterly exposition of the knowledge up to that time concerning the nature and origin of wings, says, « The leaping tendency « crops out » in the most diverse forms such as the Apterygota (e.g. *Machilis*, etc.), the Psyllids, Flea-beetles, etc., and may possibly indicate an inherent tendency in the insect stem, which finds opportunity for expression in certain forms, and would of course be especially useful in those insects which have developed large paranota ». He then points out that unless an insect has a tendency to leap into the air its lateral expansions would not have an opportunity of functioning, unless the insect were to drop from a height.

Ritter (1912) states that a blowfly leaps before it takes to flight. The writer has found that a Sarcophagid fly cannot fly from the substratum if all its legs are severed at the proximal bases of the femora and when it is placed in a suitable position for flight. A house-fly can fly with difficulty

with all its legs severed in the same manner. Haupt (1929) calls the hind limbs of the cicada *Startorgan*.

As far as the writer knows the Heteroptera and the cicada are unique in having the leaping *directly* connected with wing movement (extension). Judging from the musculature of *Psylla* given by Weber (1929) the leaping is independant of the wing movement. That is, the muscles which effect the leap do not in any direct way activate the wings.

The lateral expansions of the thoracic segments of the first and second instar larvae of *Nezara* (Pl. XVIII, fig. 3) do not differ from those of the abdominal type. The pronotal expansions are the largest even though they do not develop into wings as those of the two antecedant segments do. These lateral expansions are the tendency which Crampton mentions above. A leg muscle has become extensor of the wings and, as was proposed above, the direct wing muscles are obtained from fibers of the pleural branches of the depressors of the telopodite of the second and third limbs. When the fore wing is extended it may be mechanically demonstrated that the hind wing is also inevitably extended due to this coupling apparatus.

Haupt (1929) describes and crudely figures an extensor muscle of the fore wings which is stated to run beneath the tegula (humeral axillary) and insert on the fused costa and subcosta (costal vein). The writer could not find any such muscle in the two species of cicada he studied (Haupt studied *Platypleura octoguttata*) and it is extremely improbable that such a highly unusual muscle should exist and not exist in the same family. This would involve a marked variation in the flying mechanism which would indicate entirely different paths of descent. Haupt must have mistaken the brown stiff membrane (ligament) joining the ventral part of the humeral axillary to the basalare for an extensor muscle.

The cicada has three muscles which extend, depress, and pronate the thickened fore wing. The first one is attached to the dorsal part of the episternum ventral to the prealar bridge, and to the basisternum; the second is attached to the mesal portrusion ventral to the prealar bridge and to the anterior part of the basicoxal ridge of the coxa; the last and most significant for our purpose is a body muscle of the depressor of the mesothoracic telopodite and is attached to the mesal portrusion ventral of the tergal arm. The last one hence acts simultaneously as depressor of the telopodite and depressor-extensor of the fore wing. There is olso, similarly to *Nezara*, a tergal branch of the body depressor of the mesothoracic telopodite to the scutum. Due to the coupling apparatus the fore and hind wings are extended at once. These muscles, as far as known to the writer were first mentioned by Berlese (1909).

Differing from *Nezara*, however, the cicada has a powerful muscle attached dorsally to the mesothoracic subalare and ventrally to the meral part of the basicoxal ridge. This probably acts as depressor of the posterior

margin of the *fore* wing. A depressor-extensor-pronator is wholly lacking for the hind wing. As in *Nezara* the pleural wing process of the metapleuron is very close to the intersegmental region between the meso- and metapleura, it being unnecessary to possess room anteriorly for a depressor-extensor-pronator muscle. The depressor apparatus for the hind margin of the hind wing is highly developed. The subalar sclerite is concealed from view externally, being extended inwards with the wing membrane. The muscle inserted on the subalar sclerite of the metathorax is very powerful. The subalar sclerite is attached by a ligament to the ventral extension of the second axillary.

As in *Nezara* the pleural wing process of both segments fit into the hollows made by the *dorsal* wall of the second axillary sclerites.

VI. Phylogenetic Considerations.

(Pl. II, figs 6, 7, 8 and Pl. VI, figs 8, 9, 10)

This section deals with the possible relationships which may exist between the Heteroptera and the Homoptera and whether it is justifiable to separate them into two separate orders as some systematists do. The morphology of the Hemipteran head at once separates the Hemiptera as a distinct order from the other insects, but here we are concerned solely with the structures and mechanism presented in this paper. Contrary to Kirkaldy (1908) and in accordance with Taylor (1918) the Pentatomidae do not go under the most primitive Heteroptera as shown by the former's conception. Well-developed odoriferous glands cannot be logically considered as primitive features. Moreover, the highly lengthened thoracic pleurae, the consequent almost complete obliteration of the pleural ridges, the great diminution of the metapleural epimeron, and the prolongation of the mesothoracic scutellum over the abdomen, cannot be regarded as primitive. The Belostomidae are to be regarded as much more ancient than the Pentatomidae notwithstanding their somewhat distorted pleurae.

The Homopteran thorax is a closer approximation to the primitive Plecopteran plan than is the Heteropteran thorax. Since the cicada probably represents thoracic features which are closer to the Plecopteran thorax (which is considered as being near the fundamental Pterygote organization) than any other Homoptera, it has been chosen as representative of the latter. The genus here studied is *Tettigia* sp.. Even though *Nezara* does not represent a primitive Heteropteron it may be taken as representative of the Heteroptera all of which possess tolerably uniform features.

If relationships are to be discovered they should pertain to unique phenomena of function and structure. It was seen that both wings in *Nezara* function as a single wing due to a special coupling apparatus, a thickening of the fore wing, a lack of a depressor muscle for the hind margin of the

fore wing, and to the presence of a depressor-pronator muscle for the front margin of the hind wing. It lacks completely basalares and subalares for both wings.It was also seen that the depressor of the telopodite of the middle leg also acts simultaneously as a depressor-pronator of the remigium (fore wing up to the plica vannalis). Further, *Nezara* possesses a distal membranous area of the fore wing which extends distal of the region of the coupling apparatus. It was further seen that *Nezara* starts off into flight using its hind limbs as the principal organs of leverage.

The posterior margin of the combined second and third vannal veins of the fore wing of the cicada is bent anteriorly (fig. 6, $2V+3V$) so that it forms a longitudinal hook which fits into a similar hook (Pl. XIV, fig. 8) formed by the posterior bending of the anterior margin of the hind wind.

The fore wing of the cicada is of considerably harder texture than the hind wing. As observed by Haupt (1929) the vannal area of the fore wing functions with the hind wing with which it is coupled. In this too the cicada resembles *Nezara*.

When the fore wing of the cicada is extended at right angles to the longitudinal body axis a longitudinal region of flexure in the wing will be observed about midway distad. This is caused by desclerotization of the wing veins. In position and function it is exactly similar to the distalmost extremity of the sclerotized area of the fore wing of *Nezara*. For, as in *Nezara* the final position of the coupling apparatus is at its posterior extremity. The part of the fore wing of the cicada distal of this line of flexure should be considered homologous with the distal membranous area of the fore wing of *Nezara*.

The major parapsides of the mesotergum of *Nezara* are also present in the cicada, as well as the tergal longitudinal obliques which are attached dorsally lateral of the parapsides and act as accessory elevators of both wings. The second thoracic phragma is highly developed in the cicada and extends venrtral to the mesosternal surface.

The tergo-sterno-furcal muscles while present in the pro- and mesothorax are absent in the metathorax of the adult cicada where they would be of no use in that it possesses no odoriferous sac.

In the mechanism of flight and in the adaption of the wings to that end *Nezara* resembles the cicada.

The wing venation differs considerably in *Nezara* and the cicada (Pl. XIV figs 6 and 7). The radius of the fore wings in both is similar in that it is well developed proximally but tends to lose its identity distally. The venation of the hind wings are similar in that the costa, subcosta, and radius are fused at least proximally. Functionally the hind wing of the cicada contains four cubital veins.

The third axillary of the fore wing is, as mentioned previously, split into two, the proximal part bearing the muscle insertion, and the distal part which extends beneath the vannal flap acting as a prop and elevating the vannal region of the wing during flexion. The proximal part which is one single sclerite has three arms, *2*, *3*, and *4* (fig. 6). Arm No. *2* enters beneath the second axillary with the first flexor muscle of the wing, FlW_2 (Pl. XVIII fig. 8) ; arm No. *4* also extends mesad but is connected by a ligament to the distal extremity of the fourth axillary, *4Ax* (Pl. XIV, fig. 6 and Pl. XVIII, fig. 8) The flexor muscle, FlW_2, is attached to the dorsal part of the episternum and runs posteriad to insert on an apodeme which is formed by the inflexion of the membrane just mesal to arm No. *3*. The second axillary, *2Ax*, is very large and has a convex dorsal wall ; hence when the wing is flexed the vannal flap fitting over the posterior part of the second axillary is not conspicuous by reason of this dorsal convexity of the second axillary and is protected even though the posteriorly directed prothoracic extension does not overlap the third axillary. The second axillary has a posteriorly directing arm (fig. 6, *x*) which is connected by a ligament to a sclerotization, *y*.

Haupt points out that the cicada leaps forward into the air through the spring of its hind limbs. Another muscle FlW_2 (Pl. XVIII, fig. 8) which arises on the episternum mesal and ventral of the muscle mentioned above, directs dorsally to insert on an apodeme of the membrane just mesal to the sclerite, *y*. The action of this muscle is obscure although it is labelled as a flexor. Both these muscles are mentioned by Berlese (1909, fig. 464), but their insertions are incorrectly represented. In Pl. XVIII, fig. 8, the arrow indicates the correct position of the sclerite *y* which was oriented in order to show the third axillary to advantage.

Now as to the flexion of the fore wing in *Tettigia* sp.. The fourth axillary is in a nearly vertical position both when the wing is flexed and extended (fig. 6 and Pl. XVIII, fig. 8). The first axillary does not change its position markedly ; nor does the second axillary and it is due to this insignificant movement of the second axillary during flexion that the writer very much doubts whether muscle FlW_2 (Pl. XVIII, fig. 8) is an accessory flexor of the fore wing.

The medial axillaries, fig. 6, which are horizontal when the wing is extended, bend to the vertical position at right angles to the second axillary and beneath it. The arm No. *4* of the third axillary which forms an angle of about 90° with the fourth axillary when the wing is extended, makes an acute angle with the latter (Pl. XVIII, fig. 8) when the wing is flexed, being attached to it by a ligament (slightly sclerotized membrane). The vannal area is elevated through the agency of *3AxI*. Arm no. *2* swings posteriorly bringing with it the second axillary fig. 6. Arm no. *3* which is horizontal when the wing is extended follows arm no. *4* into the vertical position.

In the final state of flexion arm no. 4 lies vertical and obliquely against *4Ax* (Pl. XVIII, fig. 8). The vannal flap overlaps the dorsal concavity of *2Ax*. The hinge of arm no. *2* with *2Ax* directs laterad of *3AxI* and arm *b* is fairly vertical. We here have a typical position of the axillaries when the wing is flexed.

The wing is fixed at rest with *2V+3V* fitted in a lateral notch of the scutellum.

As in *Nezara* the processus scutellaris tertius alae extends ventrad towards the pleuron, but in the cicada it meets the subalar sclerite which is absent in *Nezara*. The flexion of the hind of the cicada, as indicated by Snodgrass' triangle (Pl.XIV, fig.7) does not vary from the typical. Judging from Weber's (1929) description of the thoracic musculature of *Psylla mali* both wings do not function as one, neither is their extension directly connected with the depression of any of the telepodites. Both fore and hind wings possess muscles for the extension, depression and pronation of their anterior margins and depressors for their hind margins.

For further information regarding the relationships of the Heteroptera to the Homoptera one would compare the posterior regions of the pterothorax of *Nezara* (which were found peculiar) with those of the cicada. In the cicada, as in *Nezara*, the sternopleural region of the first abdominal segment is fused with the pterothorax. A large part of the tergal region of the first abdominal segment is, however, retained by the abdomen. The tympanum, *Typ* forms a part of this region (Pl. XVIII, fig. 10 *TI*). The abdominal part of the tergum is separated from the thoracic part by ample membrane. On a lateral part of the *abdominal* part of the tergum is attached the pleural compressor of the first abdominal segment (Pl. XVIII, fig. 9, *LCrI*) which attaches ventrally on an inflection of the pleural region of the first abdominal segment. In the cicada there is a smaller accessory lateral compressor, *LCrI*[1]. This muscle assigns both the thoracic and the abdominal parts of the tergum hence described to the first abdominal segment. The antecostal ridge separating the metathoracic and first abdominal sterna does not exist mesally. The anterior border of the sternopleural region of the second abdominal segment is incorporated with the pterothorax, ample membrane separating this border from the rest of the second abdominal sternopleural region part of which forms the resonating mirrors. In all this the *Cicada* resembles *Nezara*. In the cicada, however, is a pair of spiracles in the pleura of the *first* abdominal segment just dorsal of the pleural inflections.

In the peculiarities of the posterior region of the prothorax and in the direct connection of wing extension and the depression of the middle telopodite and in the impossibility of both pairs of wings functioning other than as one *Nezara* undeniably resembles the cicada.

Whether this is infallible evidence of the relations of the Heteroptera to the Homoptera still rests upon further studies on the much diversified Homoptera and the finding out whether the factors mentioned above are really « peculiarities ».

SUMMARY.

1. The definitive pterothorax, being functionally constricted from the abdomen by a circumlocuting membrane (which is, however, ventrally not too significant) consists of the following : *a*. mesothorax, *b*. metathorax. *c*. first abdominal segment, excepting the posterior part of the tergum which is integrated with the abdomen, and, *d*. half of the sternum of the second abdominal segment which is, however, not significantly demarked from the posterior half.

2. The trunk muscles of the legs, the intrinsic muscles of the legs, and the muscles for head movement are the same in larva and adult.

3. The dilator of the internal orifice of the odoriferous sac is serially homologous with the tergo-sterno-furcal muscles of the two preceding segments as is shown by the larval and immature adult conditions.

4. The sternal longitudinals of the metathorax in the larval and immature adult conditions are divided into two by the metathoracic furca of the same side. Those present in the mature adult are only the anterior set.

5. The posterior metathoracic sternal longitudinals attach anteriorly on the posterior surface of the metathoracic furca of a side and posteriorly on the antecostal ridge separating the metathoracic sternum from the *first* abdominal sternum just posterior to the hind coxa.

6. In the immature adult the posterior sternal longitudinals of the abdomen are still present.

7. Both measurement and observation indicate that the mesothoracic tergo-sterno-furcals produce the second thoracic phragma by their tension.

8. Both wings in *Nezara* function as a single wing due to a special coupling apparatus, a thickening of the fore wing, a lack of a depressor muscle for the hind margin of the fore wing, and the presence of a depressor-pronator muscle for the front margin of the hind wing. The depressor of the telopodite of the middle leg also acts simultaneously as a depressor-pronator of the remigium (fore wing up to the plica vannalis).

9. In the cicada, as in *Nezara*, the sterno-pleural region of the first abdominal segment is fused with the pterothorax. Also a large part of the tergal region of the first abdominal segment is retained by the abdomen.

10. In the direct connection of wing extension and the depression of the middle telopodite and in the impossibility of both pairs of wings functioning other than as one *Nezara* undeniably resembles the cicada.

Abbreviations of Myological Terms Used (1)

DrPtFe, depressor of pretarsus, femoral branch.
DrPtTi, depressor of pretarsus, tibial branch.
DrTar, depressor of tarsus.
DrTi, depressor of tibia.
DrTrCx, depressor of trochanter, coxal branch.
DrTrPl, depressor of trochanter, pleural branch.
DrTrT, depressor of trochanter, tergal branch.
DrW, direct depressor of posterior margin of wing.
DSp, dilator of spiracle.
FlW, flexor of wing.
LCr, lateral compressor of abdominal segment.
LrTi, levator of tibia.
LrTr, levator of trochanter.
OrSp, occlusor of spiracle.
RrFe, remotor of femur.
SL, sternal longitudinal.
SPlAp, Sterno-pleuro-apophysal.
SPrCx, sternal promotor of coxa.
SRrCx, sternal remotor of coxa.
TL, tergal longitudinal.
TLOb, tergal longitudinal oblique.
TPrCx, tergal promotor of coxa.
TRrCx, tergal remotor of coxa.
TSF, tergo-sterno-furcal.

(1) Subscript Indian numerals indicate the thoracic segment to which the structure belongs. Roman numerals after the abbreviations indicate the abdominal segments to which the term pertains.

Abbreviations of Skeletal Terms Used (1)

AcR, antecostal ridge.
Ap, apodeme.
Aw, prealar bridge.
Ax, axillary.
AxC, axillary cord.
BCxR, basicoxal ridge.
BCxS, basicoxal suture.
BS, basisternum.
C, costal vein.
Cu, cubital vein.
Cx, coxa.
EO, external orifice of odor sac.
Epm, epimeron.
EpmFl, epimeral flap.
EpmFlL, lateral epimeral flap.
Eps, episternum.
EpsFl, episternal flap.
EpsFlL, lateral episternal flap.
Ex, ventral extension of operculum.
Fe, femur.
Fu, furca.
fu, furcal pit.
Fs, furcisternum.
H, head.
IO, internal orifice of odor sac.
JF, jugal fold.
JuL, jugal lobe.
MAx, median axillary.
Mb, membrane.
Op, operculum.
Par, parapside.
PB, postcoxal bridge.
Pc, precosta.
Per, peritreme.
Ph, phragma.
Pl, pleuron.
pl, plate.
PlR, pleural ridge.
PlS, pleural suture.
PoR, postoccipital ridge.
Psc, prescutum.
PscS, prescutal suture.
PSct, postcutellum.
PV, plica vannalis.
Pw, postalar bridge.
PWP, pleural wing process.
R, radial vein.
r, ridge and ring.
S, sternum.
Sa, subalare.
Sc, scutum and subcostal vein.
Sct, scutellum.
Sp, spiracle.
T, tergum.
Tar, tarsus.
TFl, tergal flaps.
Ti, tibia.
Tn, trochantin.
Tr, trochanter.
Ty, tympanum.
Upl, unguitractor plate.
V, vannal vein.
vda, vectis dorsualis anterior.
vdp, vectis dorsualis posterior.
WC, wing coupling apparatus.
VFl, vannal flap.

(1) Several of which are borrowed from the works of Mr. R. E. Snodgrass.

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EXPLANATION OF PLATES XIII - XVIII

Plate XIII (1).

Fig. 1. — Internal view of right half of prothoracic skeleton.

Fig. 2. — Internal view of right half of pterothorax. Sagittal section to the left of the median plane.

Fig. 3. — *a*. Anterior aspect of anterior part of mesothorax. Left half.
b. Left tergal arm and adjacent region, showing the origin of the indirect protractor muscle of the fore legs.

Fig. 4. — Internal view of right half of the sternopleural region of the pterothorax.

Fig. 5. — Ventro-posterior aspect of right half of sternopleural region of prothorax.

Fig. 6. — Mesalmost muscles of right middle leg.

Fig. 7. — Lateralmost muscles of the mesothorax.

Fig. 8. — Bases of left wings elevated to show the interrelationships of the veins, axillaries, and the dorsal structures of the pterothorax.

Fig. 9. — Ventral aspect of left, third axillary of the fore wing of *Schizops aegyptiaca* Lef.. Showing its relations to the processus scutellaris tertius alae.

Plate XIV

Fig. 1. — Left half of dorsal part of pterothorax and abdomen and proximal parts of wings spread at right angles to the body.

Fig. 2. — Right half of ventral part of thorax.

Fig. 3. — Dorsal view of fore and hind wings. Left side.

Fig. 4. — Coupling apparatus of fore-wing. Ventral aspect of that of left wing.

Fig. 5. — Same as above but belonging to the Belostomid, *Amorgius niloticus* Stäl.

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(1) Unless specified all explanations belong to the adult stage.

Fig. 6. — Proximal part of left fore wing of *Tettigia* sp.. Dorsal view.

Fig. 7. — Proximal part of left hind wing of *Tettigia* sp.. Dorsal view.

Fig. 8. — Wing coupling apparatus of hind wing of *Tettigia* sp.. Dorsal aspect and belonging to the left wing.

Fig. 9. — Left side of pleuro-sternal region of metathorax and anterior abdominal segments. 5th instar larva.

Plate XV

Fig. 1. — Posterior aspect of posterior parts of the thorax and the thoracic part of the first abdominal segment. Scutellar evagination of mesothorax snipped tranversely.

Fig. 2. — Sagittal section through posterior part of head and anterior part of prothorax to show the muscles for head movement. Right half.

Fig. 3. — Right half of prothorax showing musculature. Latero-posterior aspect.

Fig. 4. — Median sagittal section of thorax and posterior part of head.

Fig. 5. — Right mesothoracic spiracle external view.

Fig. 6. — Right mesothoracic spiracle internal view.

Plate XVI

Fig. 1. — Fore leg, dissected so as to show musculature.

Fig. 2. — *a*. Mesal aspect of right hind coxa with adjacent muscles.
b. Internal view of mesal part of trochantin, showing apodeme arising from the membrane just dorsal to it.

Fig. 3. — Posterior aspect of middle coxa.

Fig. 4. — Ventral aspect of femora-tibial joint.

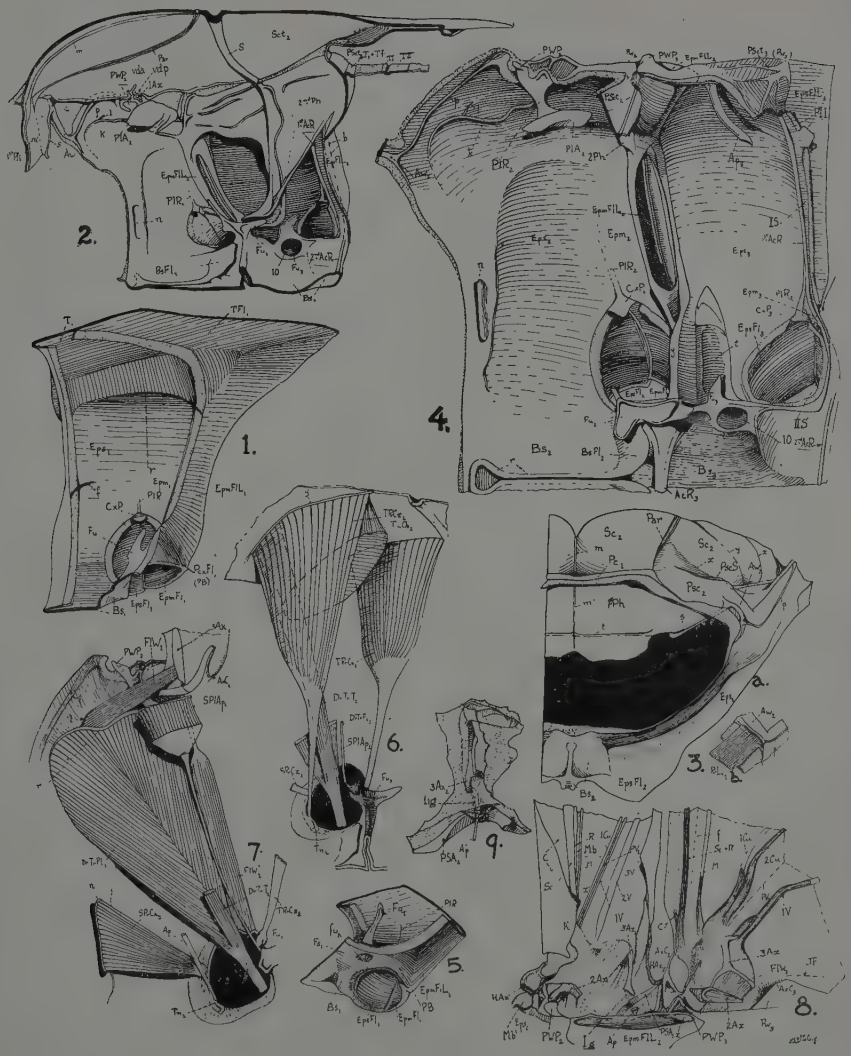
Fig. 5. — Proximal part of trochanter showing how the apodeme upon which the depressor muscles are inserted arises.

Fig. 6. — Dorsal view of left distal part of last tarsal pseudosegment including the left claw and pulvillus.

Fig. 7. — Ventral view of distal part of last tarsal pseudosegment and pretarsal structures.

N.S.R. Malouf

Plate XIII



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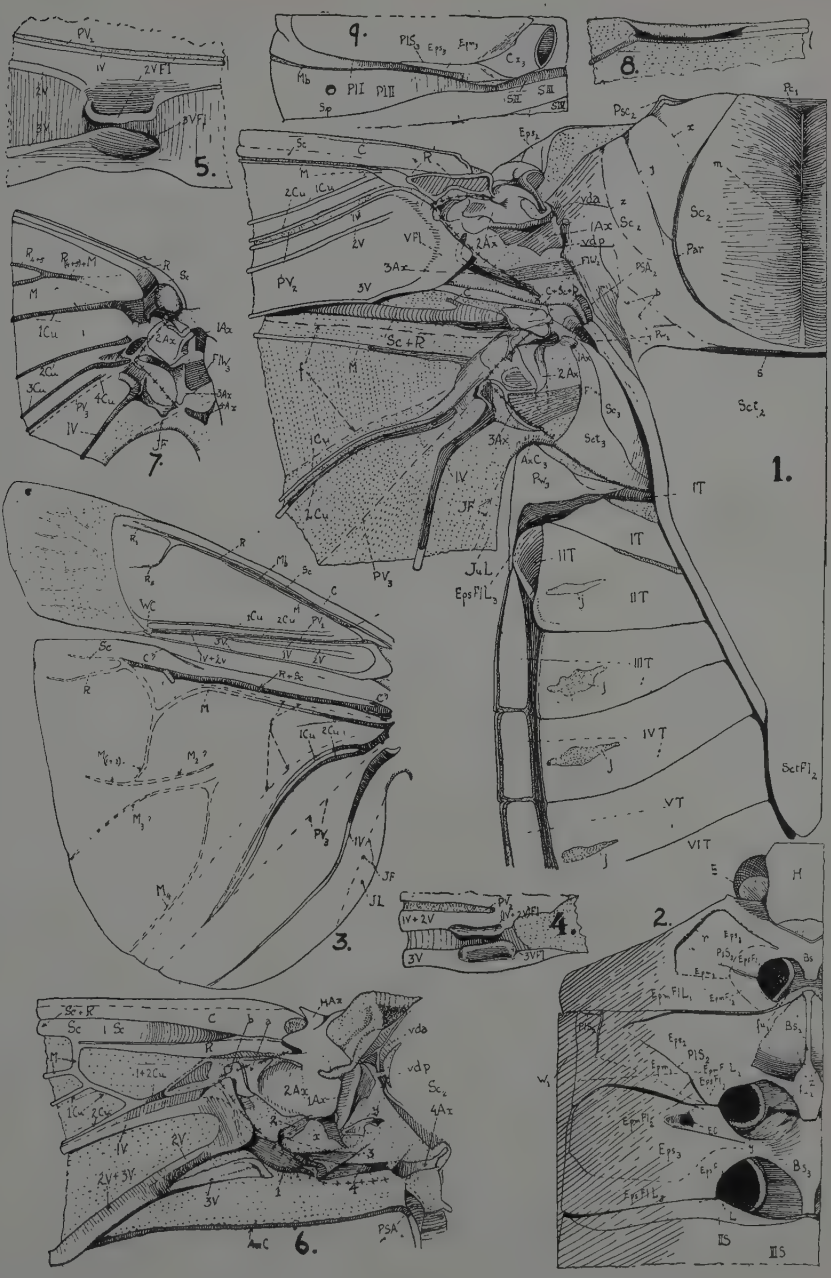
The Skeletal Motor Mechanism of the Thorax of the « Stink Bug », *Nezara viridula* L.



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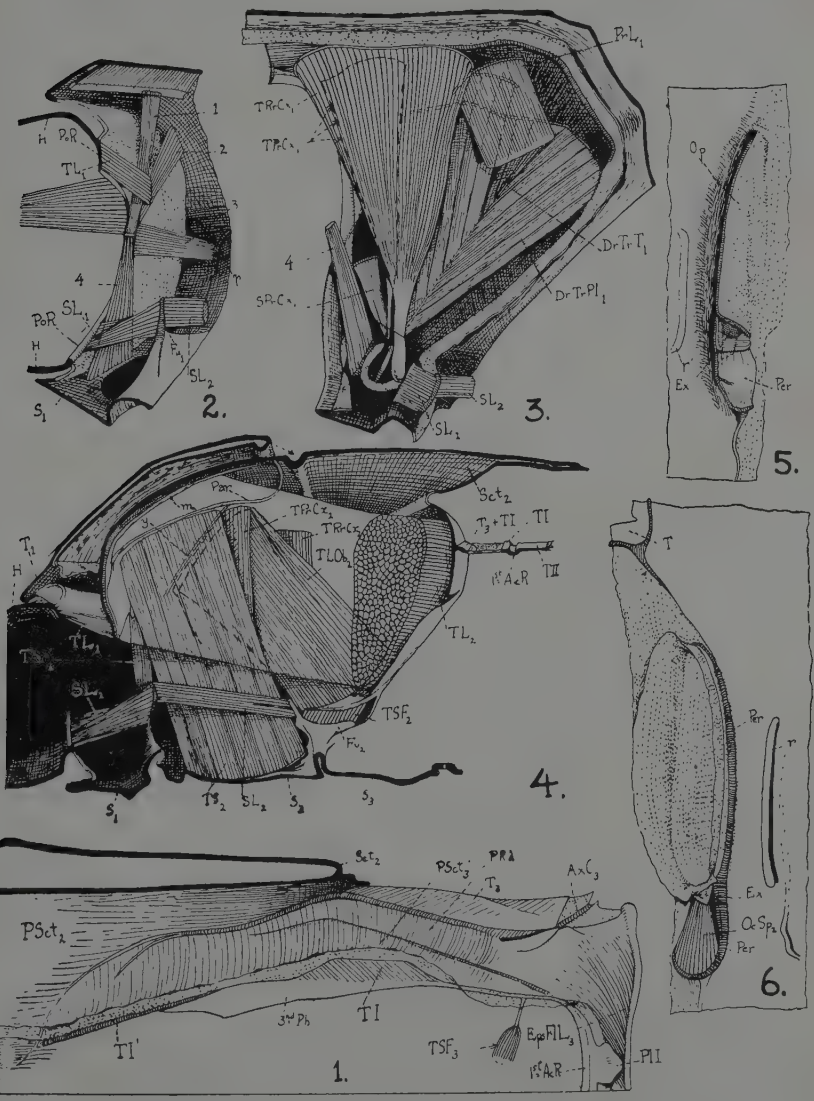
The Skeletal Motor Mechanism of the Thorax of the « Stink Bug », *Nezara viridula* L.

N.S.R. Malouf

Plate XV



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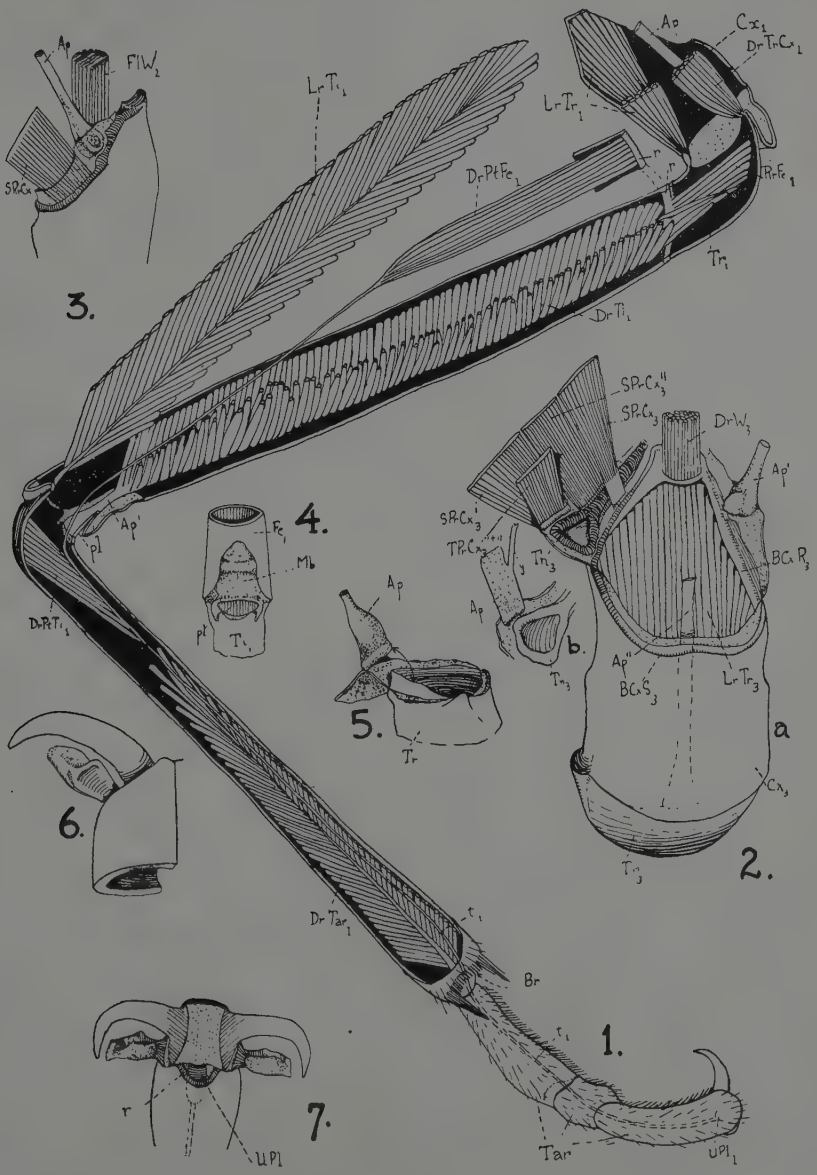

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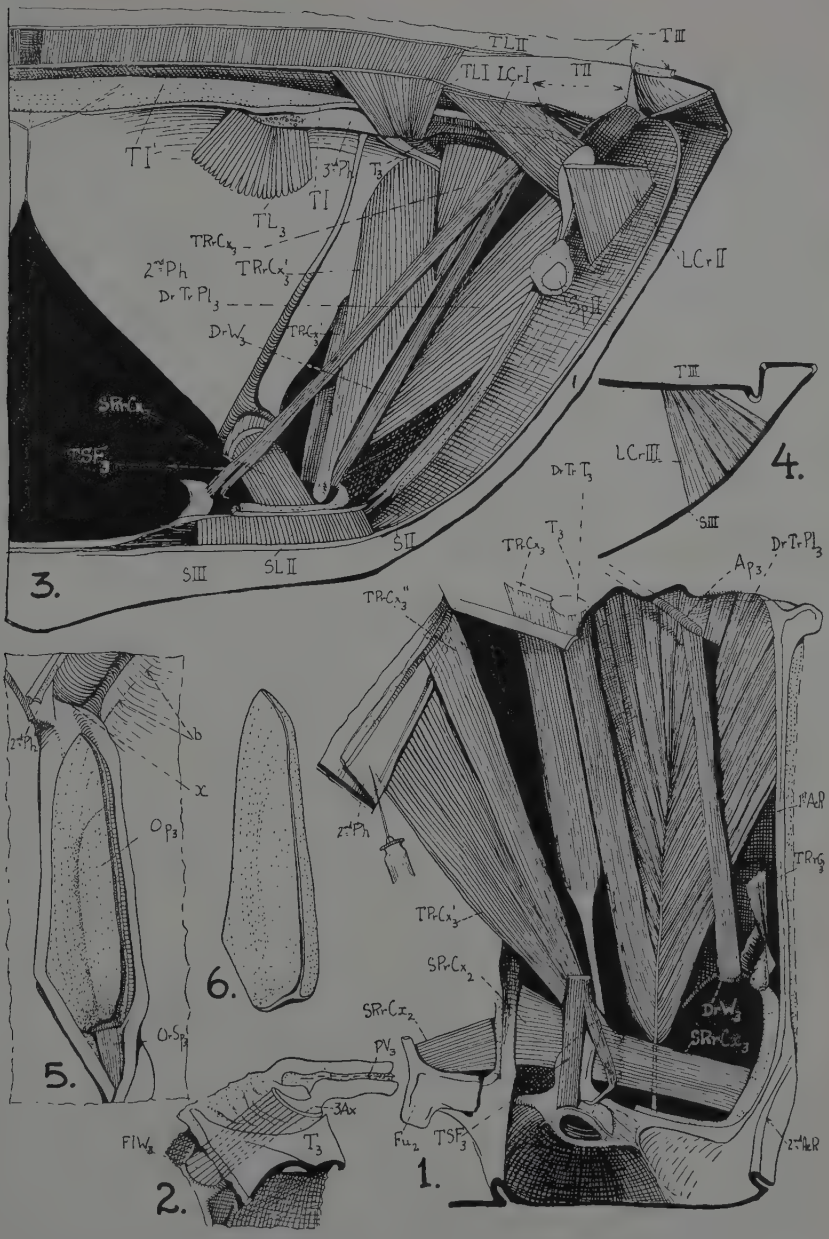

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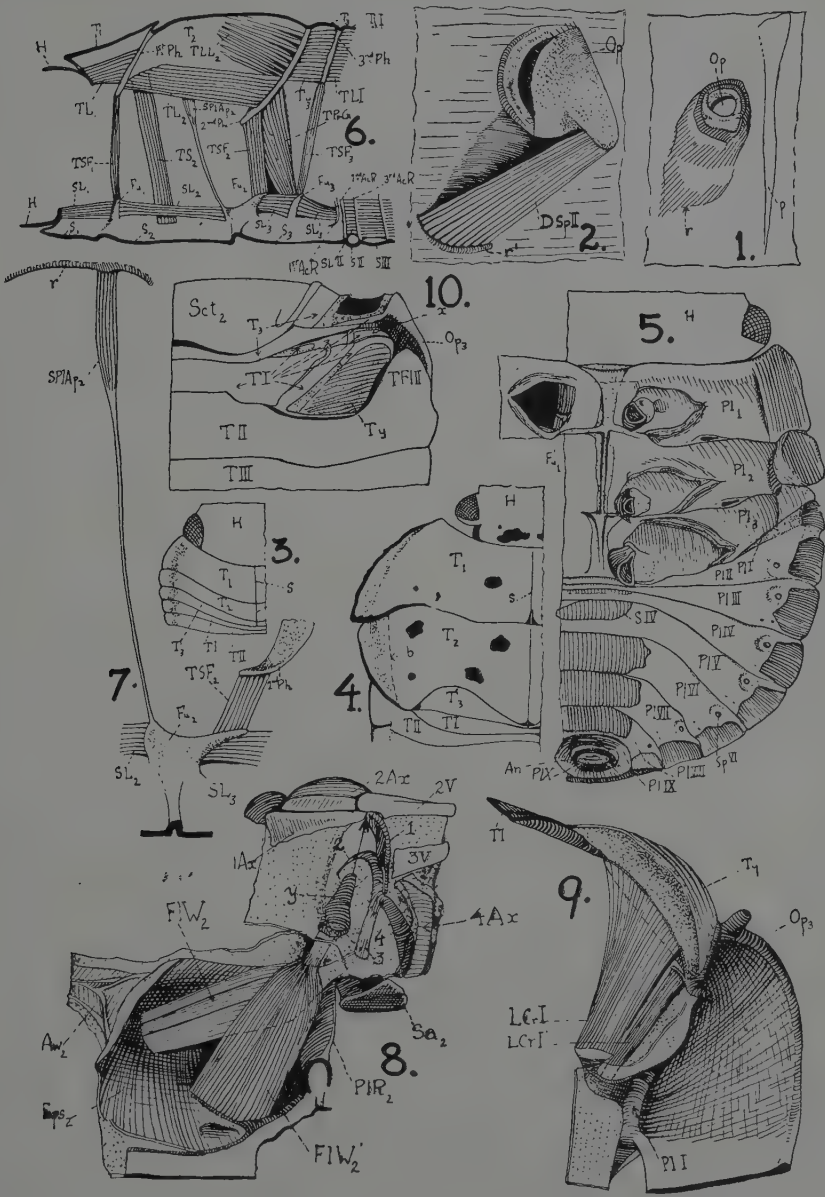
The Skeletal Motor Mechanism of the Thorax of the « Stink Bug », *Nezara viridula* L.



N.S.R. Malouf del.

The Skeletal Motor Mechanism of the Thorax of the « Stink Bug », *Nezara viridula* L.

Plate XVII

Fig. 1. — Sagittal section through metathorax showing some of its muscles. Right half.

Fig. 2. — Right, lateral part of metathoracic tergum, proximal part of posterior part of wing, and dorsal part of metathoracic episternum.

Fig. 3. — Posterior aspect of right half of metathorax, and first and second abdominal segments showing the musculature.

Fig. 4. — Transverse section of right lateral part of third compressor muscles.

Fig. 5. — Metathoracic Spiracle.

Fig. 6. — Operculum of the Metathoracic spiracle.

Plate XVIII

Fig. 1. — External aspect of left spiracle of sixth abdominal segment.

Fig. 2. — Internal aspect of right spiracle of second abdominal segment.

Fig. 3. — Dorsal aspect of thorax and posterior part of head of first instar larva. Left half.

Fig. 4. — Same of fourth instar larva.

Fig. 5. — Ventral aspect of second instar larva. Left half, except prothorax.

Fig. 6. — Sagittal section of thorax of fourth instar larva showing part of the musculature. Right half.

Fig. 7. — Muscles for the skeletal development of the mesothorax of the fifth instar larva.

Fig. 8. — Lateralmost muscles of fore wing of the cicada, *Tettigia* sp : right half.

Fig. 9. — Posterior aspect of the right lateral compressor of the first abdominal segment, and adjacent regions of *Tettigia* sp.

Fig. 10. — Dorsal aspect of posterior part of thorax and anterior part of abdomen of *Tettigia* sp.. Right half.

Séance du 20 Novembre 1932

Présidence de S.E. le Dr. Mohamed Shahine Pacha, *Président*

Communication

The Fauna of Palestinian Plants:

3. Alhagi maurorum D.C.

(with Plate XIX (43 Figures) and 2 Tables)

by Dr. Jos. Carmin and Dr. D. Scheinkin,

Independent Biological Laboratories, Tel-Aviv, Palestine.

1. The Host (Pl. XIX, Fig. 1).

Alhagi maurorum D.C. is a thorny purple flowered deep rooted and profusely branched small shrub covering in summer harvested grain fields, waste places, fallow fields, borders of ditches and alike, and is to be found all over Palestine, in the coastal regions as well as in the inner ones and is recorded as far as Arabia petraea (1). Its full range of dispersion is according to Warburg (2) from Persia up to Northern Africa, where it covers large areas on the borders of deserts and serves as food to camels. It was once believed to be the manna plant of the Bible owing to excretions in the form of red droplets to be found on its branches, a phenomenon very seldom met in our conditions, but this idea is now abandoned.

The observations were planed to be carried on on a large scale in different localities of Palestine but we were soon forced to restrict ourselves to the nearest vicinity of Tel-Aviv owing to political disturbances. Systematical observations were carried out on a ditch bordering the road of Tel-Aviv to Petah-Tikvah, on a field of Ramath-Gan and on another field of Nahlath-Itzhak. Occasional trips were undertaken to Shechunath-Montefiореh, Wadi Musrara, Lud, Ben-Shemen, Mikveh-Israel, Petah-Tikva, Kefar

(1) Aaronsohn, A. & Oppenheimer, H.R. : Florula Transjordanica. — Tiré à part du Bulletin de la Société Botanique de Genève, Vol. XXII, 1930, p. 280.

(2) Prof. Dr. Otto Warburg : Die Pflanzenwelt. — Bibliographisches Institut Leipzig und Wien, 1921 : II : 216.

Nahum, Herzlijah and many others. The work was performed during the years 1929 – 1932.

The plant was found to succeed best in heavy soils in which sufficient humidity is stored to enable its growth. Fields bordering irrigated cultures or brooks and rivers showed luxuriant growth and blossomed profusely, while otherwise the plants remained usually stunded, blossomed very little or did not come at all to blossoming. This depends to a great degree upon the quality of soil, quantity of rain in the previous winter as well as on the cultural methods which prevailed in the field and especially upon the length of time the land was left fallow. The plants are usually chopped of by the plowing and are not visible during winter, reappear in summer recovering from buds situated on the deep rooted subterranean parts of the plant.

Flowers were first observed in the vicinity of Tel-Aviv in 1929 the fourth of July, the 27th of July a much richer blossoming was observed near Ludd. Plants shrivelled and perished at the beginning of December. A much richer blossoming was observed at the vicinity of Tel-Aviv during 1930 which started at the middle of June and continued up to the middle of August, fruit started to set at the end of July, and plants began shrivelling in the middle of October. An occasional visit to the same field at the first of July 1932 showed some 5 % of the plants blossoming poorly.

2. Orgyia dubia, Tauscher.

Dispersion, feeding habits :

The larvae of *Orgyia dubia*, Tauscher are polyphagous or as Hesse [3] puts it euryphagous ; they were collected besides of *Alhagi* on different Poligonaceae, Compositae, Dipsaceae, Gramineae and others. On *Alhagi* they feed on leaves and other soft parts of the plant but never form a serious pest owing to their high parasitization and to their localized dispersion ; the man seems to help much by labouring the fields to their dispersion. It is recorded [4] as common from the Government of Astrakhan in Russia and other parts of the south eastern of this country where its larvae breed on *Alhagi camelorum*, *Artemisia absinthium* and others and cause at time considerable injury to fudder grasses. It was never observed in Palestine as far as our observations go causing damage to cultural plants (Compare Bodenheimer [5].

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[3] Hesse, R. : Tiergeographie auf ökologischer Grundlage.—G. Fischer, Jena 1924, p. 15.

[4] Sacharov, N. (Astrachanj) : Contribution à la Biologie d'*Orgyia dubia* Tausch. (Lepidoptera : Lymantriidae), avec 2 figures. — Revue Russe d'Entomologie 14 (1914). No. 4 (in Russian).

[5] Bodenheimer, F. S. : Die Schaedlingsfauna Palaestinas.—Parey, Berlin, 1931, p. 18.

Life History, Eggs:

The female pupa to be described latter deposits some hundred eggs (counted within the ovary a 115, according to Sacharov 70-140) inside of the cocoon which remain there until hatching. They are smooth, spherical, one mm. wide (1.5 mm. according to Sacharov), pearly white in colour and gradually turn yellowish. The dark coloured embryo is clearly seen through the egg shell taking an equatorial position head and tail touching.

Larvae :

All larvae are extremely phototropic; when put in a dark box with an attached test tube, they all crawl immediately to the tube and crowd there. When touched they roll into a ball and drop to the ground where they remain motionless for some time. Sacharov believes there is a seasonal as well as a sexual dimorphism in the larvae of *Orgyia* which expresses itself in colour as well as in size and number of eggs. All measurements of larvae reported here were performed on material kept in 70 % alcohol.

First larva (Pl. XIX, Fig. 2) :

2.6 mm. long; dark brown in colour with very long stiff hairs. The small larvae hatch inside the cocoon of their mother, gnaw holes in it and escape. Sakarov states that the small larvae devore their mother while still in the cocoon. The same is also suspected by Aharoni (6) for *Orgyia dubia* var. *judaica* Stgr. collected by him at Wadi Rubin. Our observations question much this statement.

Second larva (Pl. XIX, Fig. 3) :

4.9 mm. long; head dark brown; three first segments yellow, intersegmental distances grayish white; every segment is provided at its dorsal side with two bunches of stiff hairs, the hairs of the first segment being very long; 4th, 5th and 6th segments are adorned with pairs of dark spots located at some distance one from the other, all placed in a single longitudinal line and giving rise to bunches of hairs; 7th and 8th segments (or only the 7th) carry no markings; 8th - 11th (or 9th - 11th) possess a dark brown spot on their mesal line; the 12th segment is provided with a double spot whose two halves are located one close to the other.

Third larva (Pl. XIX, Fig. 4) :

9.5 mm. long. Head brown, first three segments with yellow red lateral spots joined by a yellow red stripe, out of them emanate bunches of long hairs, intersegmental distances are marked with dark lines; 4th, 5th and 6th segments are marked at their caudal part with pairs of dark red spots joined

(6) Aharoni, J. : Life-Cycle of Winged Insects in Palestine VI.—Hassadeh, Vol. VI, Nos 2 - 3, p. 70, November-December 1925 (in Hebrew).

by large stripes; intersegmental distances show dark gray stripes; 7th – 11th segments are mesally marked with dark spots located at their cephalic and caudal borders, the dorsal side being yellow red, the 12th segment shows longitudinal gray stripes.

Fourth larva (Pl. XIX, Fig. 5) :

15.5 mm. long. Head brown, mandibles dark. All segments are yellow red at their cephalic side and gray at their caudal side, darkening gradually with the approach to the caudal end; 9th - 12th segments are provided with black and red mesal spots; all segments posses lateral yellow red warts giving rise to bunches of stiff hairs. The colour variation is very pronounced at this larval stage: some have the dorsal part of the 4th-7th segments gray dark and covered with dense velvety tufts of short hairs; in others is the dorsal side of the mentioned segments of bright colour and they show no tufts of hairs whatsoever; there might possibly be some connection between coloration and sex. The paired markings on the last segments are the same as in the third larva (coloration described by Sacharov differs greatly).

Fifth larva (Pl. XIX, Fig. 6) :

20.8 mm. long, of a design similar to the one of the fourth larva. Every segment is provided with six bunches of hairs, very long in the last segment, the hairs are stiff and of a cottony gray colour, the same as in previous larvae. The red eyes are very large and inbetween them there is a white triangular marking.

Pupa (Pl. XIX, Figs 7, 8, 9) :

The last larva crowls up high on the plant (the same was observed also in glass breeding jars covered with muslin — Sacharov believes they pupate in hidden places) and spins there its cocoon which includes the hairs of the last larva. Large numbers of cocoons were observed the 22.XI.30 on wire fences in the surroundings of Petah Tikvah. This might serve the animal as a way to pass from dying vegetation to new one. It sheds then its skin and takes the form of a thick legless (Sacharov states in its mentioned paper (1), they possess minute legs) and wingless creature, whose mouth is closed and larva-like, and mandibles are functionless; it is eight segmented, mouth excluded, all segments are covered with tufts of gray velvety hairs; the body cavity is all filled with eggs, no other organs could be detected there, the eggs located on the dorsal side are embedded in small cavities. The female cocoon is 20 mm. long and 9 mm. wide; the pupa is 15 mm. long (according to Sacharov 14 - 23 mm.). The pupa deposits its eggs within the cocoon, they hatch there and the larvae crawl out later on; the pupa shrivels gradually and at the end there is left a lifless colapsed skin. The multiplication of the insect is thus parthenogenetic; scores of times were bred by us isolated larvae which pupated

and gave rise to new offspring which is in accordance with Mr. Kusnezov's (7) observations. On the outer side of the cocoon were observed to thrive fungi determined to be *Aspergillus ochraceus* Wilhelm (group species).

Sacharov records an extra instar coming in between the last larva and the stage called by us pupa and thus raises the pupa to the grade of an adult female. We never observed this extra instar under our conditions. As to the sex ratios, Sacharov records winged males as many as some 5 % of females while in our conditions they are as high as 50 % at least.

Pupa (Pl. XIX, Figs 10, 11) :

The male pupa is a typical lepidopterean pupa. The cocoon is 13 mm. (Sacharov 14 - 22 mm.). long and 8 mm. wide, the pupa is 10 mm. long (according to Sacharov 10 - 12 mm.). The ♂ cocoon is much smaller than the female one and its walls much thinner and more transparent. There exist large variations in colour, last segments being bright or dark; it is covered with long cottony hairs.

Winged ♂ (Pl. XIX, Figs 12, 13) :

No winged ♀ were observed, no ♂ was ever observed mating with ♀ pupa; at any rate ♀ pupae raised in the laboratory gave rise parthenogenetically to new offspring, the function of the male being thus not cleared up as yet for our conditions. Sacharov records some very interesting observations on the mating of the winged male with the wingless female which makes its way into the cocoon of the female. This phenomenon was never observed by us in spite of the fact that adult males were kept by us scores of times in the same containers with the female cocoons. Those as well as the others kept separately gave rise in the same manner to parthenogenetic eggs. Wing expansion 25 mm., body length 12 mm. Body colour dark, general wing colour bright cinnamoneous with longitudinal stripes joined by a changing number of dark stripes; marginal fringe of hairs yyellow. It was compared with material coming from Egypt turned in to us for this purpose by Dr. H. Priesner, Chief Entomologist of Ministry of Agriculture of Egypt and was found to be a different variety (the Egyptian material is designated in (8) as var. *judaica* Stgr.).

Distribution of different stages throughout the year (Table I) :

All stages could be observed, as Table I shows, during August up to January; the adverse season is passed presumably in the form of eggs, but we have as yet no conclusive proof for it. It is interesting to add in this

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(7) Kusnezov, N. J. : Note in Revue Russe d'Entomologie, 1905, p. 961 (in Russian).

(8) Storey, G. : List of Egyptian Insects in the Collection of the Ministry of Agriculture. — Technical Bulletin No. 5, Ministry of Agriculture, Egypt.

connection that eggs under observation stopped hatching starting from the end of August with the exception of a single case on record. The female pupal stage was in August 10 days long, the male pupal stage was in September 11 - 14 days long while in January it took as much as 41 days. Sacharov

TABLE I

Distribution of different stages of *Orgyia dubia* Tauscher throughout the year

DATE	First Larva	Second Larva	Third Larva	Fourth Larva	Fifth Larva	Female Pupa	Eggs	Male Pupa	Winged Male	HOST
1-15. VIII. 30	+	+	+	+	+	+				*Alhagi*
16-31.VIII. 30	+	+(1932)	+	+	+	+	+(1)	+		*Alhagi*
1-15. IX. 30			+(1931)	+	+	+	+(1)	+	+	*Alhagi*
16-29. IX. 30				+(1932)	+(1932)	+	+(1)	+	+	*Alhagi*
1-15. X. 30					+					*Alhagi*
16-31. X. 30			+	+	+			+	+	*Polygonum*
1-15. XI. 30	+					+	+(1931)(1)			*Alhagi*
16-30. XI. 30		+				+	+			Diverse
1-15. XII. 30								+(1931)		Diverse
16-31. XII. 30			+	+			+			Diverse
1-15. I. 31			+	+	+		+		+	Diverse
16-31. I. 31									+(1932)	Diverse
1. II-30. VI. 31										
1-15. VII .31						+				*Alhagi*
16-31. VII. 31						+				*Alhagi*

(1) Eggs gave no larvae. At the interval of 16-31. VIII some still hatched.

states there are under conditions prevailing in Astrakhan three complete generations during the year.

Parasites.

Parasites seem to be an important factor in the extermination of this insect. Out of 9 cocoons of *Orgyia dubia* collected at Nahlath Itzhak the 11.VIII.1932 four were infested by a *Microcryptus* species and two by an *Apanteles* species while of 14 cocoons collected at Raananah the 27.IX.1932 only one was infested by *Apanteles*.

1. *Microcryptus* sp.

It deposits its eggs within the larva of the host; adult parasites were bred from collected larvae kept in the laboratory. The infested larva spins its cocoon but does not pupate, the larvae of the parasite crawl out, spin their cocoons within the cocoon of the *Orgyia* and pupate there leaving after them an empty skin of the host. When mature they come out from the upper side of their cocoon, leaving there some excrement of a typical shape, eat round holes in the cocoon of their host (Pl. XIX, Fig. 14) and escape. Adults were obtained on the 20.VIII.1930, 10 from one cocoon (an eleventh was in its pupal stage), all eleven males. On the 11.VIII.1932 two females were obtained from a cocoon from which more adults escaped previously, before it was picked up.

The cocoon (Pl. XIX, Fig. 15) of the parasite is 9 mm. long and 4 mm. wide; the pupa (Pl. XIX, Fig. 16) is 7 mm. long, head and thorax black, abdomen brown, eyes glistering black.

The adult (Pl. XIX, fig. 17) has a black head (front gray), black antennae and thorax, the abdomen is brown with a black tip, the hind legs are black, the other two pairs being brown. The antennae are 27 jointed, the first one swollen, the first 11 are long and the rest short and globular, the 26th one is prolongated and the last one small and pointed at its end. The female showed a gray coloration in the 6 - 9 segments of the antennae on one side of them, the same colour was observed at the base of the second segment. The abdomen of the female is brown, its last segments black, the ovipositor (Pl. XIX, Fig. 18) is dark brown.

TABLE II

Measurements of *Microcryptus* sp. in mm.

	MALES										FEMALES	
	First Type		Second Type				Third Type			?		
Length of Head	0.6	0.6	0.5	0.7	0.5	0.6	0.6	0.8	0.8	0.8	0.5	0.5
Length of Thorax	1.3	1.3	2.0	1.9	2.0	2.1	2.3	2.1	2.	1.9	1.9	1.9
Length of first abdominal segment	0.6	0.6	1.1	1.0	1.1	1.0	1.2	1.1	—	—	1.0	1.0
Length of abdomen (less the first segment)	2.7	—	3.0	2.8	—	3.2	4.2	—	4.3	4.0	1.9	1.9
Length of Antennae	3.3	—	5.1	4.4	4.6	—	—	4.8	—	—	4.2	4.9
Length of forewing	2.6	3.0	3.7	3.4	3.5	3.5	4.3	3.9	4.5	3.3	3.0	3.4
Breadth of forewing	1.0	1.0	1.3	1.2	1.2	1.1	1.3	1.3	—	1.4	1.2	1.3
Length of ovipositor	—	—	—	—	—	—	—	—	—	—	1.6	1.6

A great difference in size was observed between the males of the parasite who may be divided in three types as shown in Table II; the measurements of the female are also added there for comparison. The examined male genitalia (Pl. XIX, Fig. 19) of the different types showed no discernible differences whatsoever.

Inhabitant of cocoon of Microcryptus :

Larvae of a small Hymenopteron were found to thrive within the web of the cocoon of *Microcryptus*, and feed upon it; they were in no way noxious to the *Microcryptus* itself as all « parasitized » cocoons gave rise to normal healthy adult *Microcryptus*.

The hairy larva (Pl. XIX, fig. 20) is 2.6 mm. long, brown in colour with four dark brown spots giving rise to bunches of stiff hairs.

The pupa (Pl. XIX, Fig. 21) is 1.8 mm. long, brown and curved in shape; it is found within the web of the cocoon of the *Microcryptus*.

The adult (Pl. XIX, figs 22, 23) is 1.8 mm. long, the fore wings are 1.4 mm. long and 0.5 mm. wide, the hind wings are 1.0 mm. long and 0.25 mm. wide: its belly was full with 8 very large yellow eggs, which might point to a viviparous or oviviparous habit of multiplication.

2. *Apanteles* sp. near *astronches*

The *Apantelcs* (Pl. XIX, Figs 24, 25) deposits its eggs within the larva of the host as larvae raised in the laboratory gave rise to the adult parasite. The infested larva spins its cocoon but does not pupate. The larvae of the parasite crawl out of the body of their host and spin their white cocoons in one communal web within the cocoon of the host. There is also on record a single case in which the infested larva pupated and deposited eggs which did not hatch, but out of this cocoon came only two parasites, and a search within the cocoon of the *Orgyia* showed no more of them. Adults emerged the 17.X.1930, 3.VII.1931, 9.XI.1930, cocoons of parasites were observed on the 8.IX.1932, 27.IX.1932 which might indicate the existence of two generations of the parasite, developing within the larva of the *Orgyia*. Sex ratios were as follows : in one case 14 adult males, 5 adult females, one female pupa and three pupae whose sex could not be made out, in a second case 16 adult females and two adult males, in a third case one adult female and one adult male. The adult is black in colour, antennae dark brown, legs brown, total length 1.9 mm., the antennae are 2.4 mm. long. The fore wings are 2.0 mm. long and 0.6 mm. wide, the hind wings are 1.5 mm. long and 0.4 mm. wide, the ovipositor is 0.3 mm. long.

3. Diorhabda persica, Fall.

Dispersion and Feeding Habits :

On the 6.IX.1929 there was observed in the field of Ramath Gan a severe attack of larvae of *Diorhabda persica*, Fall. They infected the leaves and slender branches of the plants in great numbers and ate at their upper surface irregular holes which turned soon brown and dark due to oxidation sustained possibly by some bacterial activity. Adult insects were also observed latter on to cause the same damage. Observations carried on in Shechunath-Montefioreh on the 29.X.1929 showed the same typical gnawing marks of the larvae. In 1930 these marks started to appear in Ramath-Gan and Nachlath-Itzhak the 10.IV and became numerous the 25.VII. The plants as a whole withstood perfectly well the attack and continued their growth and development.

First larva (Pl. XIX, Fig. 26) :

5 mm. long, yellow at first but darkens soon, except for the ventral side which remains yellow throughout its life ; it is covered with profusely stiff hairs. Observed first 6.IX.1929.

Second larva (Pl. XIX, Fig. 27) :

7.5 mm. long, its general appearance and colour is the same as of the previous one, observed from 15.IX.1929 up to 15.X.1929.

Pupa (Pl. XIX, Fig. 28) :

Formed by the second larva from its excrements. Observed 15.IX.29.

Adult ♂ (Pl. XIX, Fig. 29) :

Brown yellow in colour, legs yellow, antennae yellow with dark tips ; 5.0 - 6.5 mm. long, average 5.5 mm. ; the wings cover all abdominal segments, the antennae are 12 jointed, the last one somewhat swollen, the first one curved.

Adult ♀ (Pl. XIX, Fig. 30) :

Colour and antennae the same as in the male. The general shape differs greatly from the one of the other sex, as can be made out from corresponding figures. The wings do not cover the last three abdominal segments. The female is also somewhat larger 5.5 - 7 mm. long average 6 mm. and thus much less agile than the male. The adults were observed from the 23.IX.29 up to the 15.X.1929 ; in 1930 they were first detected at the 8.IX. Mating was observed in nature the 15.IX.1929, which occurred in the usual way, the male being on the back of the female.

4. Galls.

Galls (Pl. XIX, Figs 31 - 34) were observed on branches and thorns of

the plant. The thorns are branch-like in the *Alhagi* in their structure (Pl. XIX, Figs 35, 36) and contain vascular tissue. Galls are often met at the axils of the branches and thorns. In a single gall there might be observed as many as 10 - 12 punctures. The galls are at first oval oblong, one to two mm. large, they swell then in their centre and become globular, their shape becoming irregular at the end of their development, and reaching the size of 8 - 9 mm. and even more. The puncture is dark surrounded by a yellow area. The gall is green at first then becomes dark brown, and cracks appear with the advancement of its age. Galls are also met on the neck of the plant as well as at the beginning of its root. The punctures are often unsuccessful and give rise to no galls, they become in such a case surrounded by a dark area infested with fungi. In a few rare cases round holes which might be due to such punctures were also observed on young fruits, but no galls were ever observed on them.

Galls were first observed in the surroundings of Tel-Aviv, on the 26.VI.1929, and prevailed up to the 26.XI.1929; they were again observed on the 27.V.1930 and the 10.VI.1930; it is also interesting to note that examination of plants at Lud on the 27.VII.1929 showed at that date almost no galls at all while they were extremely numerous at that time at Tel-Aviv. The inhabitants of the gall are to be found within the vascular tissue of the plant which turns brown around the insect (Pl. XIX, Fig. 37). By breeding were obtained from the galls two insects: the one a *Eurytoma* species and the other one a Pteromalid which must be parasitic upon the first one. They were obtained from the 11.VII.1929 up to the 22.IX.1929.

1. *Eurytoma* sp. (Pl. XIX, Figs 38 - 40)

The bright yellow larva is 1.8 mm. long and 0.9 mm. wide. The pupa is black, 2 mm. long. The adult is black, the first joint of the legs black and the rest brown, the antennae are dark brown; it is 1.6 mm. long, antennae 0.5 mm. long, fore wing 1.1 mm. long and 0.5 mm. wide, hind wing 0.5 mm. long and 0.1 mm. wide, the ovipositor is 0.2 mm. long.

2. *Pteromalid* (Pl. XIX, Figs 41 - 43)

The bright yellow larva is 1.0 mm. long and 0.4 mm. wide. The pupa is bright yellow with red eyes. The adult is black, abdomen and legs dark brown, 1.1 mm. long, antenna 0.3 mm. long, the fore wing is 0.8 mm. long and 0.4 mm. wide, the hind wing is 0.5 mm. long and 0.1 mm. wide, the ovipositor is 0.1 mm. long.

5. Occasional visitors.

Microphanurus ? alpestris, Kiepper :

The 27.V.1930 was collected on a thorn of the *Alhagi* a cluster of eggs containing some 20 – 30 eggs, of which emerged the 9.VI.1930 five adult parasites : 2 males and 2 females, one whose sex could not be made out. On examination of the eggs they were all found to contain pupae of *Microphanurus* enclosed in a though envelop.

Tychius sp. :

2.VIII.1929 ; 21. VIII.1929 ; 6.IX.1929 ; 24.IX.1929.

Pachybrachys glycyrrhizae, Ol. :

10.VIII.1929.

Empusa sp. (larva) :

1.X.1929 ; 9.IX.1930, raised from batches of eggs collected on the plant.

Hemiptera :

Unidentified Aphids were observed on young growth 10.VIII.1929, 27.V.1930, 10.VI.1930.

Jassid larvae, probably Bythoscopinae, 6.IX.1929.

There are some singular records of visitors which might be due to occasion and thus not reported here.

The reported investigation is based on material deposited in the Biological Museum of the Independent Biological Laboratories at Tel-Aviv, Palestine and includes consecutive numbers AI.1 - AI.163.

Parallel Collections will be soon deposited in some of the larger Museums of other countries as far as available material will allow. The biology of the plant as well as its external and internal structure will be reported elsewhere more in detail.

Acknowledgments.

This opportunity is gladly taken to express our deepest indebtedness to the British Museum for the kind identification of the entomological material mentioned in this article, to the Mycological Institute of London for determination of fungus found on cocoon of *Orgyia*, to Dr. A. Eig of the Hebrew University of Jerusalem for the exact determination of the host plant, to Dr. H. Priesner, chief entomologist of the Ministry of Agriculture of Egypt, for providing us with material of the *Orgyia* from the collections of the Ministry of Agriculture for comparison purposes, to Mr. B. Zizik of Herzlijah for some observations on the biology of the host plant, to Miss Y. Greenfeld of the Independent Biological Laboratories, to Mr. J. Segal a student of the

College of Agriculture and Natural Sciences and to two boys of the Gymnasiah Ahad Ha'am at Petah Tikvah (U. Zahavi and O. Shifres) for turning in collected material of *Orgyia* and to Miss H. Podolith of the Independent Biological Laboratories for some technical help on preparation of collected Aphids. Special thanks are due to the U.S.S.R. Society for Cultural Relations with Foreign Countries of Moscou for the troublesome search they went into to look for the paper of Mr. Sacharov on *Orgyia* in all archives and libraries of U.S.S.R. which took almost a year and for their extreme kindness in copying for us the wanted paper as well as the included photographs.

Summary.

The biology of *Alhagi maurorum* D.C. is taken up as well as the life history of its different inhabitants: *Orgyia dubia*, Tauscher and *Diorhabda persica* Fall. infesting leaves and young shoots of the plant. Two insects, a *Microcryptus* sp. and *Apanteles* sp. were found to parasitize the larvae of *Orgyia*, their life history is reported as far as worked out. The web of the cocoon of the *Mycrocryptus* sp. was found to be infected by a minute unidentified Hymenopter developing within it and causing no visible damage to the host. From galls were obtained a *Eurytoma* sp., described and figured and a Pteromalid which is presumably parasitic upon it, also described and figured.

Explanation of Plate XIX

Fig. 1. Blossoming branch of *Alhagi maurorum* D.C. — Lud 27.VII.1929 (Natural Size).

Fig. 2. *Orgyia dubia*, Tauscher: First larva (×2).

Fig. 3. *Orgyia dubia*, Tauscher: Second larva (×2).

Fig. 4. *Orgyia dubia*, Tauscher: Third larva (×2).

Fig. 5. *Orgyia dubia*, Tauscher: Fourth larva (×2).

Fig. 6. *Orgyia dubia*, Tauscher: Fifth larva (×2).

Fig. 7. *Orgyia dubia*, Tauscher: Female pupa, lateral view (×2).

Fig. 8. *Orgyia dubia*, Tauscher: Caudal end of ovary (×2).

Fig. 9. *Orgyia dubia*, Tauscher: Cocoon of female pupa after emergence of larvae (Natural Size).

Fig. 10. *Orgyia dubia*, Tauscher: Male pupa (×2).

Fig. 11. *Orgyia dubia*, Tauscher: Cocoon of male pupa after emergence of winged male (Natural Size).

Fig. 12. *Orgyia dubia*, Tauscher: Winged male (×2).

Fig. 13. *Orgyia dubia*, Tauscher: Male genitalia of winged adult (×375).

Fig. 14. *Orgyia dubia*, Tauscher: Female cocoon after emergence of adult *Microcryptus* (Natural size).

Fig. 15. *Microcryptus* sp.: Cocoon after emergence of adult (×2).

Fig. 16. *Microcryptus* sp.: Pupa (×2).

Fig. 17. *Microcryptus* sp.: Adult male (×5).

Fig. 18. *Microcryptus* sp.: Abdominal segments of adult female (×10).

Fig. 19. *Microcryptus* sp.: Male genitalia (×50).

Fig. 20. Inhabitant of cocoon of *Microcryptus* sp. larva (×12.5).

Fig. 21. Inhabitant of cocoon of *Microcryptus* sp.: Cocoon (×12.5).

Fig. 22. Inhabitant of cocoon of *Microcryptus* sp.: Fore wing of adult (×12.5).

Fig. 23. Inhabitant of cocoon of *Microcryptus*: Hind wing of adult (×12.5)

Fig. 24. *Apanteles* sp.: Adult male (×10).

Fig. 25. *Apanteles* sp.: Abdominal segments of female, side view (×25).

The Fauna of Palestinian Plants : 3. *Alhagi maurorum* D.C.

Fig. 26. *Diorhabda persica*, Fall. : First larva (× 2).

Fig. 27. *Diorhabda persica*, Fall. : Second larva (× 2).

Fig. 28. *Diorhabda persica*, Fall. : Cocoon cemented of excrements of larva (× 2).

Fig. 29. *Diorhabda persica*, Fal. : Adult male (× 2).

Fig. 30. *Diorhabda persica*, Fall. : Adult female (× 2).

Fig. 31. *Alhagi maurorum* D.C. : Thorn, very young gall, only punctures seen (× 8). — 26.VI.1929.

Fig. 32. *Alhagi maurorum* D.C. : Thorn with a somewhat older gall which begins to swell at its center (× 8). — 26.VI.1929.

Fig. 33. *Alhagi maurorum* D.C. : A more advanced gall in axil of branch (× 8). — 26.VI.1929.

Fig. 34. *Alhagi maurorum* D.C. : An old gall with many cracks (× 8). — 26.VI.1929.

Fig. 35. *Alhagi maurorum* D.C. : Cross-section of stem. — 27.II.1929.

Fig. 36. *Alhagi maurorum* D.C. : Cross-section of a thorn.

Fig. 37. *Alhagi maurorum* D.C. : Cross-section of a gall.

Fig. 38. *Eurytoma* sp. : Larva (× 12.5).

Fig. 39. *Eurytoma* sp. : Pupa (× 12.5).

Fig. 40. *Eurytoma* sp. : Adult male (× 12.5).

Fig. 41. Pteromalid : Larva (× 12.5).

Fig. 42. Pteromalid : Pupa (× 12.5).

Fig. 43. Pteromalid : Adult male (× 12.5).

Séance du 6 Décembre 1932

Présidence de S.E. le Dr. Mohamed Shahine Pacha, *Président.*

Dons d'ouvrages:

La Société a reçu pour sa Bibliothèque les publications suivantes :

1° De l'Administration des Biens Privés et des Palais Royaux : un exemplaire du second volume de l' « *Histoire de la Nation Egyptienne* », par Gabriel Hanotaux, publié sous les auspices de S.M. le Roi Fouad 1er.

2° De Monsieur S. Mahdihassan : 4 tirés à part de ses travaux entomologiques.

3° De S.E. le Major Général Amin Malouf Pacha : un exemplaire de son Dictionnaire de Zoologie.

4° Du R.P. Longin Navas (Espagne) : 5 brochures de ses travaux sur les Névroptères.

5° De Monsieur L. Masi de Gênes : 2 brochures de ses travaux sur les Micro-Hyménoptères.

6° De Messieurs les Docteurs J. Carmin et D. Scheinkin : un exemplaire du Premier Rapport du Laboratoire Biologique Indépendant de Tel-Aviv (Palestine).

7° De Monsieur E. Rivnay (Palestine) : 5 brochures de ses travaux entomologiques.

8° De Monsieur Jean Ghesquière, de Paris : 9 brochures de ses travaux.

9° De Monsieur le Prof. S. Metalnikov, de l'Institut Pasteur de Paris : 10 tirés à part de ses travaux.

10° De Monsieur le Dr. U. Soleri, de Rhodes : un exemplaire de son étude sur « *L'Apicoltura nelle isole italiane dell'Egeo*, 1932 ».

11° De Monsieur P. de Peyerimhoff, d'Alger : 6 tirés à part de ses travaux sur la faune coléoptérologique.

12° De Monsieur J. E. M. Mellor, Angleterre : Une note relative à son voyage dans l'Est Africain.

13° De Monsieur J. Omer-Cooper, de Londres : 6 brochures relatives à ses travaux sur les insectes aquatiques.

14° De Monsieur le Prof. Guido Torriani, du Caire : 4 brochures des travaux entomologiques de Monsieur Paoli Luigioni, extraits des « *Atti della Pont. Accad. delle Scienze Nuovi Lincei* ».

15° De Monsieur Guido Paoli, Italie : une copie de son travail intitulé

« *Specie nuove di* Empoasca (*Hemiptera-Homoptera*) *e appunti di Corologia*, 1932 ».

Le Conseil remercie les généreux donateurs.

Contributions aux Collections d'Ornithologie :

Monsieur Alfred Reinhart, d'Alexandrie, a généreusement versé la somme de L.E. 50 afin de permettre le développement des collections ornithologiques de la Société.

Monsieur Edgard Chakour fait don d'un exemplaire naturalisé d'*Erismatura leucocephala.*

Le Conseil remercie.

Nominations :

Sont admis à faire partie de la Société comme membres titulaires :

Monsieur Mahmoud Effat, de Beni-Souef, et Monsieur Ragheb Abdel Malek, entomologiste attaché à la Section de la Protection des Plantes du Ministère d'Agriculture, proposés par Messieurs H. C. Efflatoun Bey et Kamel Mansour ; Monsieur Emilio Calzolari, d'Alexandrie, et Monsieur Paul Sagnard, de Paris, proposés par Messieurs Edgard Chakour et A. Alfieri ; Monsieur A. M. Frangopoulos, d'Alexandrie, proposé par Messieurs Abdel Megid El Mistikawy et A. Alfieri ; le Musée Entomologique « Pietro Rossi » de Duino (Italie), fondation de S.A.S. le Prince Alexandre Charles de la Tour et Tasse, proposé par Messieurs H. C. Efflatoun Bey et A. Alfieri.

Echange des Publications :

Se fait inscrire le Journal of the Imperial Agricultural Station in Japan (Nishigahara, Tokyo).

Nécrologie :

Le Secrétaire Général a le regret de faire part du décès de Monsieur Jacques Green, qui faisait partie de la Société depuis sa fondation.

Divers :

Le Conseil approuve la proposition de Monsieur A. Alfieri tendant à désigner du nom de « Salle Walter Innes Bey » une des pièces de la Société. A cet effet, une plaque portant l'inscription précitée sera apposée à l'entrée de la chambre contigüe à la " Salle Ferrante ».

Communications

Note sur le Genre *Cybister* Curtis

(Coleoptera-Dytiscidae)

par Alexandre Petroff.

Au cours des années 1926-1928, j'ai eu l'occasion d'effectuer une série de chasses dans les mares d'eau (saturée de soude caustique) du Wadi Natroun situées aux environs du lac Hamrah et du village de Kafr Daoud.

J'y trouvais le *Cybister tripunctatus* Ol. (=*aegyptiacus* Peyr.), très commun partout en Egypte, et une autre espèce du même genre, le *C. laterimarginalis* De Geer, qui paraît être, dans ces parages, aussi fréquente que la première.

A l'époque de ma première chasse, vers la mi-Avril 1926, je ne récoltais que des *Cybister tripunctatus* Ol. L'année suivante, au début du mois de Mai, je prenais un nombre approximativement égal de *C. tripunctatus* Ol. et de *C. laterimarginalis* De Geer, la plupart des mâles et quatre femelles, parmi lesquelles trois exemplaires de *C. laterimarginalis* De Geer ayant tous les trois le pronotum réticulé et les élytres striolés. Au début de Juillet 1928, je prenais encore un mâle de *C. laterimarginalis* De Geer.

N'ayant trouvé aucune mention de *C. laterimarginalis* De Geer dans les Bulletins de la Société Royale Entomologique d'Egypte, je fis part de ma trouvaille à Monsieur Anastase Alfieri, notre distingué Secrétaire Général, qui a bien voulu me fournir les très précieux renseignements qu'avec sa permission j'introduis ici, in extenso :

« Au sujet de *Cybister laterimarginalis* De Geer, il existe dans la collection W. Innes Bey (actuellement propriété de la Société Royale Entomologique d'Egypte) une ♀ mutilée de cette espèce, rapportée par le Dr. Hume, il y a bien 25 ans, vraisemblablement du Wadi-Natroun.

J'ai moi-même récolté trois exemplaires de la même espèce, à l'oasis de Baharieh, en Mars 1925, dont une ♀ (élytres striolés : caractère plus ou moins constant) et 2 ♂ (élytres lisses, tarses antérieurs dilatés).

D'autre part, voici la nomenclature des espèces égyptiennes du genre *Cybister* :

1° *C. tripunctatus* Ol. (=*aegyptiacus* Peyron, *africanus* Cast.).

Espèce commune, même à l'oasis de Baharieh d'où j'ai rapporté de nombreux exemplaires.

2° *C. laterimarginalis* De Geer (*Roeseli* Fuessly, *virens* Müll., ♀ *Jordanis* Reiche). — Ut supra.

3° *C. binotatus* Klug (*vulneratus* Klug).

♂ et ♀ très communs à l'oasis de Baharieh où j'ai récolté de nombreux exemplaires en Janvier 1928, Mars 1925, Avril 1922. — Espèce très typique.

4° *C. Reichei* Aubé.

Le Coleopterorum Catalogus, pars 71, page 264, le cite de l'Est Africain, du Sénégal et d'Egypte. Cette dernière localité est cependant plus que douteuse.

Quoiqu'il en soit, *C. Reichei* se distingue par la tête à clypeus jaune (comme chez *laterimarginalis*), les côtés et le devant du pronotum largement jaune. — Longueur 19 - 20 mill ».

C. binotatus Klug et *C. Reichei* Aubé me sont inconnus. Quant aux *C. laterimarginalis* De Geer de ma collection, ils présentent bien les caractères typiques assignés à l'espèce. De plus, le tableau ci-après, extrait de la *Description Synthétique des espèces des Dytiscides et des Gyrinides*, par le Dr. G. Seidlitz (*C. Reichei* Aubé n'y est pas mentionné), permettra de distinguer les espèces ci-dessus mentionnées.

A. Tarses postérieurs pareils chez ♂ et ♀, garnis des deux côtés de cils natatoires. Tarses médians du ♂ sans brosses. Angles du sommet des cuisses postérieures allongés en pointe. Bord externe de l'aile latérale du métasternum plus faiblement courbé, convergeant en arrière avec le bord latéral des épipleures et restant éloigné de ce dernier du double de la largeur de la partie en forme de languette. Dessous jaune avec taches foncées; épipleures foncés, jaunes en avant et parfois aussi en partie en arrière. Dessus vert foncé, une large bande jaune à côté du bord latéral (la bande n'atteint souvent le bord que devant). Chez la ♀ le plus souvent tout le pronotum a des rayures réticulées, et les élytres sont couverts jusqu'au sommet de rayures, cependant il existe des ♀ avec des élytres unis. — Longueur 31 - 35 mm. ..... *laterimarginalis* De Geer. (synonymie : *Roeselii* Fuessly, *virens* Müll., *Jordanis* Rche).

A'. Tarses postérieurs garnis des deux côtés chez le ♂ de cils natatoires, chez la ♀ il n'y en a qu'au bord interne. Aux tarses médians du ♂ il y a au moins un article garni de brosses en dessous. Angles terminaux des cuisses postérieures fortement rectangulaires. Bord extérieur des ailes latérales du métasternum courbé, courant parallèlement en arrière avec le bord latéral des élytres et à peine éloigné de celui-ci de la largeur de la partie en forme de languette.

1. Epipleures et bord latéral des élytres jaunes. Pronotum de la ♀ toujours lisse; élytres du ♂ ayant très rarement de légères

traces de rayures ; tarses postérieurs de la ♀ sans trace d'un deuxième ongle. La partie velue du tarse antérieur élargi du ♂ est triangulaire.

a. Corps faiblement bombé (à peu près comme chez *laterimarginalis*). Aux tarses intermédiaires du ♂ il n'y a que les deux premiers articles qui soient garnis de brosses. Dessous avec taches rouges sur les épisternes du métasternum et sur les trois avant-derniers segments abdominaux il existe une petite tache au bord externe. — Longueur 22 - 31 mm. — Dans tout le bassin de la Méditerranée .... *tripunctatus* Ol. (synonymie : *africanus* Lap. (sic), *aegyptiacus* Peyr.).

1'. Epipleures et bord latéral des élytres foncés. D'après Sharp il existe aux tarses postérieurs de la ♀ un deuxième ongle rudimentaire. La partie velue des tarses antérieurs du ♂ est en forme de bande tout à fait étroite, pas plus large que la première rangée de ventouses. Aux tarses médians du ♂ il n'y a que le prémier article garni de brosses. Dessus vert-noir, seulement le bord latéral du pronotum est plus ou moins rougeâtre et il existe sur le sommet de chaque élytre une petite tache rouge qui cependant manque parfois. — Longueur 28 mm. ..... *binotatus* Klug. (synonymie : *bivulnerus* Aubé).

Beitrag zur Kenntnis der *Chalicodoma*-Arten von Aegypten

von J. D. Alfken, Bremen.

Ueber die *Chalicodoma*-Arten Aegyptens haben sich Radoszkowski und Friese in mehreren Arbeiten verbreitet. Von den von Friese in den Bienen Europa's, p. 37, als zu *Chalicodoma* gehörig aufgeführten Arten scheiden *C. syraensis* Rad. (1) als eine *Pseudomegachile*-Art und *C. cornifrons* Rad., das mit *Osmia taurus* F. Smith artgleich ist, aus. Als *Chalicodoma*-Arten sind dort aber aufzunehmen: *Pseudomegachile branicki* Rad., *P. albocincta* Rad., *Megachile aegyptia* Lep. und *M. incerta* Rad.

Durch das Entgegenkommen der Herren Professoren Dr. H. Bischoff vom Zoologischen Museum Berlin und Dr. Jan Stach vom Physiographischen Museum in Krakau, denen ich auch an dieser Stelle dafür pflichtschuldigst danke, konnte ich die Typen der von Radoszkowski beschriebenen Arten untersuchen. Der grösste Teil der Sammlung Radoszkowski wird in Krakau aufbewahrt; ein kleinerer gelangte in den Besitz des Zoologischen Museums Berlin. Die dort befindlichen Tiere wurden schon früher von Friese untersucht; das Ergebnis seiner Untersuchungen wurde im Beiheft der Deutschen Ent. Ztschr., 1909, p. 124-128, veröffentlich. Zu den dort niedergelegten Deutungen sei folgendes bemerkt:

58. *Megachile incerta* ist nicht *Chalicodoma siculum* Rossi var., sondern eine eigene Art und zwar des ♂ zu *Megachile branicki* Rad. ♀. Es sind also *Chalicodoma incertum* Rad. ♂ (nur diese wurde beschrieben) und *C. branicki* Rad. ♀ die Geschlechter derselben Art, die *C. incertum* heiszen muss; da diese Art zuerst beschrieben wurde.

Das ♂ von *C. branicki* findet sich in keiner der beiden Sammlungen. Aus der Beschreibung lässt sich jedoch ersehen, dass es einer anderen Art angehört. Das zu ihm gehörende ♀ steht dem von *C. nasidens* Friese sehr nahe.

64. *M. syraensis* Rad. ist nicht *Chalicodoma lefebvrei* Lep., sondern *Pseudomegachile syraensis* Rad.

Ueber *Megachile aegyptia* Lep. in der Sammlung Radoszkowski ist zu sagen, dass unter diesem Namen dort 2 ♀ aus Algerien und ein ♀ aus

(1) Diese Art wurde von mir irrtümlich in die Gattung *Chalicodoma* gestellt. D. Ent. Ztschr., 1928, p. 43. Das dort beschriebene *C. syraense* ist aber eine *Chalicodoma*-Art und zwar eine noch unbenannte; sie möge *C. fallax* heissen. Der Typus, ein ♀ von Kyrenia auf Cypern, das ich Herrn A. Mocsary verdanke, befindet sich in meiner Sammlung.

Tauria stecken, die mit *C. lefebvrei* Lep. artgleich sind, und ein ♀ aus «Dal.» (wohl Dalmatien), das ein *C. murarium* Retz. ist.

Meiner in der Deutschen Ent. Ztschr., 1928, p. 41 und 42, gegebenen Diagnose der Gattung *Chalicodoma* füge man p. 42, Zeile 2 hinter Innenrand der Oberkiefer hinzu : « geradlinig begrenzt » und Zeile 9 hinter bildend : « der mittlere Kerbzahn oft stärker und breit vorstehend ».

C. murarium Retz. ssp. *aegyptium* Lep. entfernt sich im weiblichen Geschlecht nur wenig, im männlichen dagegen beträchtlich von der europäischen Rasse.

Es dürfte angebracht sein, hier auch die *Megachile savignyi* Rad. zu behandeln. Als Herkunft dieser Art, die in der Sammlung Radoszkowski's fehlt, werden Dalmatien und Aegypten angegeben. In dem im Zoolog. Museum Berlin sich befindenden Teil der Sammlung Radoszkowski's steckt ein ♀, bezettelt « Dal », wohl Dalmatien, das Radoszkowski bei der Beschreibung sicher vorgelegen hat ; da diese vortefflich auf das Stück passt. Es ist sehr abgeflogen und hat einen stark ausgezogenen Hinterleib. Bei abgeflogenen Stücken sind die Flügel so gefleckt, und bei Stücken mit ausgezogenem Hinterleib ist dieser so geformt, wie Radoszkowski in der Beschreibung angibt.

In der *M. savignyi* von Dalmatien liegt nichts anderes als ein abgeflogenes *Chalicodoma murarium* Retz. vor. Die ägyptischen Stücke müssen auf *C. murarium* Retz. ssp. *aegyptium* Lep. bezogen werden.

Die von Dours von den griechischen Inseln beschriebene *Megachile leucopogonata* ist. m.M. nach auf die vorliegende Rasse zu deuten.

C. aegyptium Lep.	C. murarium Retz.
♀.	♀.
Die grösszten Stücke erreichen eine Länge von 18 mm.	Die grösszten Stücke erreichen eine Länge von 17 mm.
Mesonotum auf der Scheibe dicht, lang abstehend behaart.	Mesonotum auf der Scheibe dünn, kurz abstehend behaart.
Flügel heller schwarzblau gefärbt, Adern, besonders die Randader deutlich braunrot gefärbt.	Flügel dunkler schwarzblau gefärbt, Adern, besonders die Randader undeutlich braunrot gefärbt.
♂.	♂.
Länge wie beim ♀.	Länge wie beim ♀.
Gesicht oberhalb der Fühler gelbgrau behaart.	Gesicht oberhalb der Fühler gelbbraun behaart.
Mesonotum grau, Mittelsegment hell gelbbraun, Schläfen und Sternum weisz behaart.	Thorax und Mittelsegment gleichfarbig, rotgelb behaart.

1. - 3. Rückenplatte des Hinterleibs gelblich behaart.	1. - 3. Rückenplatte des Hinterleibs rötlichbraun behaart.
7. Platte am Ende breit abgerundet, manchmal flach eingebuchtet.	7. Platte am Ende mehr zugespitzt.
Fuszglieder in gröszerer Ausdehnung gelbrot gefärbt, das Klauenglied stets hell.	Fuszglieder in geringerer Ausdehnung gelbrot gefärbt, das Klauenglied meist gebräunt.

C. aegyptium Lep. ist die aegyptische Rasse des *C. murarium* Retz., die im weiblichen Geschlecht recht wenig, im männlichen schon erheblich von diesem abweicht.

C. nigrita Rad., von dem sich der Typus in der Sammlung Radoszkowski befindet, wurde schon von Friese richtig als *Chalicodoma*-Art behandelt. Die Art soll nach Radoszkowski in der Gestalt des Hinterleibs der *Megachile lagopoda* L. gleichen, was keineswegs der Fall ist. Der Typus ist ein kleines *C.murarium* Retz. mit weisz behaarten Wangen.

In der Sammlung Radoszkowski steckt ein stark abgeflogenes ♀ aus « Tauria », bei dem die weisze Wangenbehaarung nur noch schwer zu erkennen ist.

C. siculum Rossi.—Radoszkowski hat schon, Horae Soc. Ent. Ross., v. 12, p. 114, 1876, darauf hingewiesen, dass das ♂ des in Aegypten vorkommenden *C. siculum* Rossi sich durch die weiszen Haare des Gesichts, der Unterseite des Kopfes und des Sternums von den italienischen, algerischen und griechischen Stücken unterscheidet. Ich kann diese Angabe bei den italienischen und griechischen Stücken bestätigen, nicht aber bei den algerischen. Die letzteren stimmen durchaus mit den ägyptischen überein.

Die übrigen von Radoszkowski dort angegebenen Unterschiede finde ich nicht bestätigt. Da aber auch das ägyptische ♀ von denen anderer Herkunft abweicht, dürfte es angebracht sein, diese Form zu benennen. Beide seien nachstehend mit einander verglichen :

C. siculum Rossi var. albifascies var. nov.	C. siculum Rossi
♀.	♀.
Grund der Flügel hell, gelbrot.	Flügel gleichmäszig getrübt, am Grunde nicht heller.
♂.	♂.
Haare des Gesichts, der Unterseite des Kopfes und des Sternums weisz gefärbt,	Diese Haare gelblich gefärbt.

C. incertum Rad. und *C. branicki* Rad.

Von *Megachile* (*Chalicodoma*) *nasidens* Friese habe ich im Zoolog. Museum Berlin den Typus des Weibchens, Algeria, 20.5.1890, untersucht. Darnach muss ich die Beschreibung von Friese insofern berichtigen, als nicht nur die 1., sondern die 1. und 2. Rückenplatte des Hinterleibs schneeweisz behaart und dass die Platten 3 - 6 nicht kurz graubraun behaart sind, sondern dass die Behaarung auf diesen aus kürzeren gelbbraunen und längeren schwarzen Haaren besteht.

Das von Friese in den Bienen Europas, v. 5, p. 181, erwähnte grosze ♀ aus der Lybischen Wüste, das ich ebenfalls sah, ist ein *Chalicodoma incertum* Rad.

Das ♂ soll nach Friese dem ♀ ähnlich sein; ich finde dies nicht. Am Hinterleib dieses Geschlechts ist nich nur die 1., sondern es sind, wie beim ♀, die beiden ersten Rückenplatten weisz behaart.

Radoszkowski beschrieb als *Megachile branicki* eine *Chalicodoma*-Art aus Aegypten, deren ♂ mit *C. nasidens* Friese nahe verwandt, deren ♀ aber mit *C. incertum* Rad. artgleich ist; letzteres schliesze ich daraus, dass sich in der Sammlung des ägyptischen Ackerbau-Ministeriums beide Geschlechter befinden, die zu gleicher Zeit und am gleichen Orte zusammen gefangen wurden.

Das echte ♀ von *C. branicki*, das Radszkowski nicht kannte, ist eine andere Art, die *C. nasidens* Fr. aus Algerien nahe steht; es besitzt denselben zahnartig vorgezogenen Kopfschild wie das ♀ dieser Art.

Nachstehend werden diese beiden Arten mit einander verglichen :

C. nasidens Friese.	C. branicki Rad.
♀.	♀.
13 mm. lang.	15 - 17,5 mm. lang.
Beine rostrot behaart.	Beine schwarz behaart.
Scheitel gelbbraun behaart.	Scheitel in der Regel schwarzbraun behaart.
1. und 2. Rückenplatte des Hinterleibs seitlich buschig gelbrot, in der Mitte abstehend weisz behaart.	1. und 2. Rückenplatte des Hinterleibs seitlich buschig schwarz, in der Mitte abstehend schwarz oder schwarzbraun behaart.
3. - 6. Rückenplatte (von der Seite betrachten) gelbbraun und schwarz behaart.	3. - 6. Rückenplatte schwarz behaart.
6. Platte am Grunde anliegend gelbbraun behaart.	6. Platte am Grunde anliegend schwarz oder schwarzbraun behaart.
Bauchbürste in der Mitte gelbrot, im Umkreis schwarz gefärbt.	Bauchbürste schwarz gefärbt.

♂.	♂.
12 mm. lang.	13. - 14 mm. lang.
1. und 2. Rückenplatte des Hinterleibs weisz behaart.	1. - 3. Rückenplatte des Hinterleibs weisz behaart.
Hinterschienen auszen rostrot behaart.	Hinterschienen auszen schwarz behaart.
Vorderschenkel nur an der Grundhälfte schwarz gefärbt.	Vorderschenkel fast ganz schwarz gefärbt.

C. albocinctum Rad. — Das durch viele plastische Merkmale an Fühlern und Beinen ausgezeichnete ♂ ist unverkennbar. Das ♀ ähnelt durch die schwache Behaarung und die eingedrückten vorderen Rückenplatten des Hinterleibs sehr dem *C. branicki* Rad.

Diese Art ist in Ober-Aegypten heimisch; ich kenne sie von Assuan, Luxor, der Kitchener Insel und dem ägyptischen Sudan. Nach Friese kommt sie auch in Ostafrika und am Senegal vor.

Nach der Bestimmungstabelle von Radszkowski, Bull. Soc. Nat. Moscou, v. 48, p. 133, 1874, ist die Bauchbürste des Weibchens weisz; nach der Diagnose, l.c., p. 145, schwarz und nach der Beschreibung, ebenda, in der Mitte rot und an den Seiten schwarz.

In den Bienen Europa's stellt Friese die vorliegende Art in die Gattung *Pseudomegachile*, in den Bienen Afrika's in die Gattung *Chalicodoma*.

C. desertorum F. Mor.—Ich glaube nicht fehl zu geben, wenn ich die mir vorliegenden Stücke aus Aegypten auf diese Art beziehe, die in beiden Geschlechtern an der überall rostroten Körperbehaarung kenntlich ist.

Die Varietät *atrorufa* Friese, von der ich dank der Liebenswürdigkeit Dr. F. Maidl's vom Naturhist. Museum Wien den Typus vergleichen konnte, ist von Friese gut gekennzeichnet worden. Seiner Beschreibung sei noch hinzugefügt, dass die Oberkiefer wie bei der typischen Form, rot gefärbt sind und dass die letzte Rückenplatte des Hinterleibs ganz rotgelb behaart ist.

C. atrocastaneum sp.n. — ♀. 16 mm. lang. Schwarz. Oberkiefer teilweise rotbraun gefärbt. Kopfschild dicht und grob punktiert, der Vorderrand abgestutzt, mit kleinen Kerbzähnen besetzt. Gesicht und Scheitel dicht gelbbraun behaart, letzterer mit einigen dunklen Härchen. Schläfen graugelb behaart. Schaft und 2. Geiszelglied der Fühler gelbrot gefärbt. — Thorax oben gelbbraun. Pleuren und Sternum schwarz behaart. Mesonotum dicht und kräftig punktiert. Seiten des Mittelsegments weisz behaart.—1. Rückenplatte des Hinterleibs länger gelbbraun behaart, dicht und kräftig runzlig punk-

tiert. Bauchbürste sehr kurz hellgelbbraun, an den Seiten und auf der letzten Platte schwarz gefärbt. Beine mit Ausnahme der Hüften und Schenkelringe rot gefärbt. Die Hinterfersen innen ein wenig rundlich erweitert, etwa birnförmig gestaltet. Flügel am Grunde gelblich, vor dem Auszenrande stark gebräunt, blau schimmernd.

Abu Rawash, 3 April 1926, Coll. R. Mabrouk, 1 ♀, Typus. In der Sammlung des Ministry of Agriculture in Cairo.

Chalicodoma Lep.

♀.

1. Beine schwarz gefärbt. Mesonotum schwarz oder schmutziggrau behaart. Flügel schwarzblau gefärbt ..... **2.**

— Beine rot gefärbt. Mesonotum braunrot oder rostrot behaart. Flügel auszer bei *C. branicki* Rad. am Grunde gelblich gefärbt, am Auszenrande getrübt ..... **4.**

2. Thorax und Hinterleib ganz schwarz behaart. Mesonotum auf der Scheibe und die Rückenplatten des Hinterleibs dicht abstehend behaart. Bauchbürste schwarz gefärbt ..... **3.**

— Mittelsegment, Mesosternum und 1. Rückenplatte des Hinterleibs weisz behaart. Mesonotum auf der Scheibe dünn und kurz, schmutziggrau behaart. Rückenplatten des Hinterleibs fast kahl. Bauchbürste schwarz, in der Mitte gelbbraun gefärbt. 15 - 16 mm. lang. .. **C. albocinctum** Rad.

3. Wangen dicht abstehend weisz behaart. Stirn swischen den Fühlern mit einigen grauen Haaren. Flügel, besonders die hinteren, am Grunde hell, im übrigen blauschwarz. 14 mm. lang ..... **C. nigrita** Rad.

— Der ganze Körper schwarz behaart. Flügel gleichmäszig getrübt, blauschwarz gefärbt. 16 - 18 mm. lang ..... (*C. savignyi* Rad. p.p., *C. leucopogonatum* Dours) **C. murarium** Retz. ssp. **aeygptium** Lep.

4. Hinterleib ganz oder fast ganz schwarz behaart ..... **5.**

— Hinterleib ganz oder grösztenteils rot behaart ..... **8.**

5. Hinterleib ganz schwarz behaart ..... **6.**

— Hinterleib nicht ganz schwarz behaart ..... **7.**

6. Fühlerschaft rot gefärbt. Kopf, Mesonotum und Mittelsegment dicht und lang hellbraunrot behaart. Hinterleib dicht behaart, auf den ersten 2 Rückenplatten nicht grubig vertieft. Kopfschildvorderrand in der Mitte nicht zahnartig vorgezogen. Beine hellrot gefärbt, rostrot behaart. 12.5 - 5 mm. lang ..... **C. siculum** Rossi var. **albifacies** var. nov.

— Fühlerschaft schwarz gefärbt. Kopf und Mesonotum dicht und kurz dunkelrotbraun behaart, Mittelsegment weisz behaart. Hinterleib fast kahl, 2. und 3. Rückenplatte am Grunde in der Mitte quer eingedrückt.

Kopschildvorderrand in der Mitte breit, zahnartig vorgezogen. Beine dunkelrot gefärbt, schwarz behaart. 15 - 17.5 mm. lang..... ..... **C. branicki** Rad. var.

7. Mittelsegment und 1. Rückenplatte des Hinterleibs weisz behaart. Mesonotum kurz, dunkelrotbraun behaart. 2. und 3. Rückenplatte am Grunde in der Mitte quer eingedrückt. Oberkiefer schwarz gefärbt. Kopfschildvorderrand in der Mitte breit, zahnartig vorgezogen. Fühler schwarz gefärbt. Flügel stark getrübt, violett schimmernd. 15 - 17.5 mm. lang. ..... **C. branicki** Rad.

— Gesicht, Oberseite des Thorax und 1. Rückenplatte des Hinterleibs gelbbraun behaart. 2. und 3. Rückenplatte nicht eingedrückt. Oberkiefer rot gefärbt. Kopfschildvorderrand abgestutzt, kerbzähnig. Schaft und 2. Geiszelglied der Fühler gelbrot gefärbt. Flügel gelb, mit schwartzblauer Auszenhälfte. 16 mm. lang ..... **C. atrocastaneum** sp.n.

8. Oberkiefer rot gefärbt. Fühlerschaft und manchmal auch Geiszelglied 1 oder 1 und 2 rot gefärbt. Flügel gelb gefärbt, der Auszenrand gebräunt ..... **9.**

— Oberkiefer und Fühler schwarz gefärbt. Flügel am Grunde gelb, am Auszenrande braun mit violettem Schimmer. Die 1. Rückenplatte des Hinterleibs, der Grund und die Hinterrandseiten der 2. und manchmal auch der 3., sowie das Mittelsegment weisz behaart. 16 - 17 mm. lang. ..... (*C. branicki* Rad. ♀, nec ♂) **C. incertum** Rad.

9. Körper einfarbig rostrot behaart, die Haare an den Endrändern der Rückenplatten des Hinterleibs dicht und breit bindenartig hervortretend, die Endplatte an Spitzenhälfte schwarz behaart. 13 - 14 mm. lang .... **C. desertorum** F. Mor.

— Pleuren, Sternum, Mittelsegment und 1. Rückenplatte des Hinterleibs schwarz gefärbt. Endplatte ganz gelb behaart. .... **C. desertorum** F. Mor. var. **atrorufum** Fr.

♂.

1. Fühler einfach ..... **2.**

— 5. - 12. Geiszelglied der Fühler unten knotig vortretend, Endglied an der Spitze abgestutzt, nach unten in eine rundliche Platte verlängert. Oberkiefer am Grunde mit einem starken, stumpfen Zahn. Schläfen unten mit einem groszen, gebogenen, gelbweiszen Haarbüschel. Gesisht dicht weisz oben gelblich; Mesonotum kurz schmutziggrau; Mittelsegment, Sternum und 1. Rückenplatte des Hinterleibs weisz behaart, die übrigen Rückenplatten fast kahl. Vorderfersen oben platt gedrückt, unten verbreitert, oben gelbrot, unten weisz gefärbt und dicht weisz behaart. 2. - 4. Fuszglied unten verbreitert und mit langem, schneeweiszem Haar-

büschel besetzt. Klauenglied lang und schmal, fast so lang wie die 3 vorhergehenden Glieder zusammen genommen. Ueber sämtliche Fuszglieder zieht sich an der Oberkante ein schwarzbrauner Streifen entlang. Schienen und Schenkel der 2 hinteren Beinpaare mehr oder weniger, Füsze fast ganz dunkelrot gefärbt. 6. Hinterleibsplatte mit vielen, oft gespaltenen Zähnen besetzt; 7. in 3 Zähnchen vortretend. Flügel stark getrübt, am Grunde hell. 15 - 16 mm. lang. ..... **C. albocinctum** Rad.

2. Beine ganz oder fast ganz rot gefärbt ..... **3.**

— Beine schwarz gefärbt. Gesicht oberhalb der Fühler gelbgrau. Mesonotum grau, Mittelsegment hellgelbbraun, Schläfen und Sternum weisz, 1. - 3. Rückenplatte des Hinterleibs gelblich behaart. 6. Platte am Hinterrande mit vielen kleinen Zähnen besetzt; 7. als kleine, rundliche, am Ende etwas eingebogene Platte vortretend. Hinterfersen schmal, parallelseitig. Flügel am Rande ein wenig getrübt. 15 - 18 mm. lang .... **C. murarium** Retz. ssp. **aegyptium** Lep. Hierher auch das unbekannte ♂ von *C. nigrita* Rad.

3. Hinterfersen unten stark verbreitert, birnförmig ..... **4.**

— Hinterfersen schmal, parallelseitig oder unten sehr wenig verbreitert. **5.**

4. Mesonotum und 1. Rückenplatte des Hinterleibs rostrot. 4. - 6. schwarz behaart. Bauch schwarz behaart, in der Mitte mit grauen Haaren untermischt. 13 - 16 mm. lang .... **C. siculum** Rossi ssp. **albifacies** ssp. nov.

— Mesonotum vorn grau, hinten, wie das Mittelsegment und alle Rückenplatten des Hinterleibs, gelbbraun behaart, die 5. und 6. Platte mit schwarzen Haaren untermischt. Bauch fast ganz grau behaart. 12.5 - 14 mm. lang ..... **C. desertorum** F. Mor.

5. Die 4 ersten Rückenplatten des Hinterleibs weisz behaart. 2. und 3. Platte am Grunde nicht eingedrückt. 6. Platte seitlich tief eingebuchtet. Die vorderen Bauchplatten weisz, die hinteren schwarz behaart. Hinterfersen verhältnismäszig länger und schmaler. Vorder-und Mittelschienen oft mit schwarzen Längsstreifen. 15 - 16 mm. lang. .. **C. incertum** Rad.

— Die 3 ersten Rückenplatten des Hinterleibs weisz behaart. 2. und 3. Platte am Grunde quer eingedrückt. 6. Platte seitlich nicht eingebuchtet. Alle Bauchplatten schwarz behaart, die Haare an den Hinterrändern etwas heller. Hinterfersen verhältnismäszig kürzer und breiter. Vorder- und Mittelschienen stets ganz rot gefärbt. 13 - 14mm. lang..... .... **C. branicki** Rad.

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Ma poi saggio virtude è conoscere
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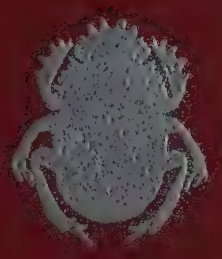

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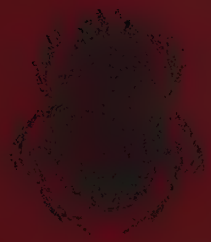

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